FUJITSU

SPARC Enterprise
M4000/M5000 Servers

Service Manual

C120-E352-06EN

FUJITSU

SPARC Enterprise™ M4000/M5000 Servers Service Manual

Manual Code C120-E352-06EN
Part No. 819-7903-13
August 2009, Revision A

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Preface

This manual describes how to service SPARC Enterprise™ M4000/M5000 servers. It is written for maintenance providers who have received training under a self-maintenance contract.

This section includes:

- "Glossary" on page xvii
- "Structure and Contents of This Manual" on page xviii
- "SPARC Enterprise M4000/M5000 Servers Documentation" on page xix
- "Text Conventions" on page xxii
- "Prompt Notations" on page xxii
- "Syntax of the Command-Line Interface (CLI)" on page xxiii
- "Environment Requirements for Using This Product" on page xxiii
- "Conventions for Alert Messages" on page xxiv
- "Notes on Safety" on page xxv
- "Alert Labels" on page xxviii
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- "Fujitsu Welcomes Your Comments" on page xxxi

Glossary

For the terms used in the "SPARC Enterprise M4000/M5000 Servers Documentation" on page xix, refer to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Glossary*.

Structure and Contents of This Manual

This manual is organized as described below:

- CHAPTER 1 Safety and Tools

  Describes safety and tool information.

- CHAPTER 2 Fault Isolation

  Describes overview and fault diagnosis information.

- CHAPTER 3 Periodic Maintenance

  Describes the periodic maintenance required to keep the server running regardless of whether a problem has occurred.

- CHAPTER 4 FRU Replacement Preparation

  Describes how to prepare a field-replaceable unit (FRU) for safe removal.

- CHAPTER 5 Internal Components Access

  Describes how to access the internal components.

- CHAPTER 6 Storage Devices Replacement

  Describes how to remove and install the main storage systems.

- CHAPTER 7 Power Systems Replacement

  Describes the power supply units and how to remove and replace them.

- CHAPTER 8 I/O Unit Replacement

  Describes how to remove and install the I/O unit and PCI cassettes.

- CHAPTER 9 XSCF Unit Replacement

  Provides an overview of the unit and describes how to remove and replace it.

- CHAPTER 10 Fan Modules Replacement

  Describes how to remove and install the fan modules.

- CHAPTER 11 Memory Board Replacement

  Describes how to remove and replace memory boards and DIMMs.

- CHAPTER 12 CPU Module Replacement

  Describes how to remove and replace the CPU modules.

- CHAPTER 13 Motherboard Unit Replacement

  Describes how to remove and replace the motherboard.

- CHAPTER 14 Backplane Unit Replacement

  Describes how to remove and replace the backplane unit.

- CHAPTER 15 Operator Panel Replacement

  Describes how to remove and install the operator panel.
- APPENDIX A Components List

  Shows the midrange servers nomenclature and component numbering.
- APPENDIX B Rules for System Configuration

  Shows the system configurations for the midrange servers.
- APPENDIX C FRU List

  Shows the midrange server FRUs.
- APPENDIX D External Interface Specifications

  Shows the enternal interface specifications for the midrange servers.
- APPENDIX E UPS Controller

  Shows the connection of UPC interface, which controls UPS (Uninterruptible Power Supply).
- APPENDIX F Abbreviations

  Shows the lists that the proper names of acronyms found in this manual.
- Index

  Provides keywords and corresponding reference page numbers so that the reader can easily search for items in this manual as necessary.

SPARC Enterprise M4000/M5000 Servers Documentation

The manuals listed below are provided for reference.

Book Titles	Manual Codes
SPARC Enterprise M4000/M5000 Servers Site Planning Guide	C120-H015
SPARC Enterprise Equipment Rack Mounting Guide	C120-H016
SPARC Enterprise M4000/M5000 Servers Getting Started Guide	C120-E345
SPARC Enterprise M4000/M5000 Servers Overview Guide	C120-E346
Important Safety Information for Hardware Systems	C120-E391
SPARC Enterprise M4000/M5000 Servers Safety and Compliance Guide	C120-E348
External I/O Expansion Unit Safety and Compliance Guide	C120-E457

Book Titles	Manual Codes
SPARC Enterprise M4000 Server Unpacking Guide	C120-E349
SPARC Enterprise M5000 Server Unpacking Guide	C120-E350
SPARC Enterprise M4000/M5000 Servers Installation Guide	C120-E351
SPARC Enterprise M4000/M5000 Servers Service Manual	C120-E352
External I/O Expansion Unit Installation and Service Manual	C120-E329
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI Build Procedure	C120-E361
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Administration Guide	C120-E331
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide	C120-E332
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF Reference Manual	Go to the Web
SPARC Enterprise M4000/M5000/M8000/M9000 Servers Dynamic Reconfiguration (DR) User's Guide	C120-E335
SPARC Enterprise M4000/M5000/M8000/M9000 Servers Capacity on Demand (COD) User's Guide	C120-E336
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI User's Guide Guide	C120-E360
SPARC Enterprise M4000/M5000 Servers Product Notes	Go to the Web
External I/O Expansion Unit Product Notes	C120-E456
SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers Glossary	C120-E514
SPARC Enterprise /PRIMEQUEST Common Installation Planning Manual	C120-H007

1. Manuals on the Web

   The latest versions of all the SPARC Enterprise Series manuals are available at the following websites.

   Global Site

   http://www.fujitsu.com/sparcenterprise/manual/

   Japanese Site

   http://primeserver.fujitsu.com/sparcenterprise/manual/

Note – Product Notes are available on the website only. Please check for the most recent update on your product.

2. Documentation CD

   For the Documentation CD, please contact your local sales representative.

   - SPARC Enterprise M4000/M5000 Servers Documentation CD (C120-E365)

3. Manual on the Enhanced Support Facility x.x CD-ROM disk

   - Remote maintenance service

Book Title	Manual Code
Enhanced Support Facility User's Guide for REMCS	C112-B067

4. Manual (man page) Provided in system

   XSCF man page

Note – The man page can be referenced on the XSCF Shell, and it provides the same content as the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF Reference Manual*.

5. Sun Microsystems Software (for Solaris OS, etc.) Related Manuals

   http://docs.sun.com

6. Information on Using the RCI function

   The manual does not contain an explanation of the RCI build procedure. For information on using the RCI function, refer to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI Build Procedure* and *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI User's Guide* provided on the website.

Text Conventions

This manual uses the following fonts and symbols to express specific types of information.

Fonts/symbols	Meaning	Example
AaBbCc123	What you type, when contrasted with on-screen computer output. This font represents the example of command input in the frame.	XSCF> **adduser jsmith**
AaBbCc123	The names of commands, files, and directories; on-screen computer output. This font represents the example of command output in the frame.	XSCF> **showuser -p** User Name: jsmith Privileges: useradm auditadm
Italic	Indicates the name of a reference manual	See the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.
" "	Indicates names of chapters, sections, items, buttons, or menus	See Chapter 2, "Fault Installation."

Prompt Notations

The following prompt notations are used in this manual.

Shell	Prompt Notations
XSCF	XSCF>
C shell	machine-name%
C shell super user	machine-name#
Bourne shell and Korn shell	$
Bourne shell and Korn shell super user	#
OpenBoot™ PROM	ok

Syntax of the Command-Line Interface (CLI)

The command syntax is as follows:

- A variable that requires input of a value must be enclosed in <>.
- An optional element must be enclosed in [ ].
- A group of options for an optional keyword must be enclosed in [ ] and delimited by |.
- A group of options for a mandatory keyword must be enclosed in {} and delimited by |.
- The command syntax is shown in a box.

Example:

```
XSCF> showuser -a
```

Environment Requirements for Using This Product

This product is a computer that is intended to be used in a computer room.

For details on the operational environment, see the *SPARC Enterprise M4000/M5000 Servers Site Planning Guide*.

Conventions for Alert Messages

This manual uses the following conventions to show alert messages, which are intended to prevent injury to the user or bystanders as well as property damage, and important messages that are useful to the user.

WARNING:
This indicates a hazardous situation that could result in death or serious personal injury (potential hazard) if the user does not perform the procedure correctly.

CAUTION:
This indicates a hazardous situation that could result in minor or moderate personal injury if the user does not perform the procedure correctly. This signal also indicates that damage to the product or other property may occur if the user does not perform the procedure correctly.

IMPORTANT:
This indicates information that could help the user to use the product more effectively.

Alert messages in the text

An alert message in the text consists of a signal indicating an alert level followed by an alert statement. Alert messages are indented to distinguish them from regular text. Also, a space of one line precedes and follows an alert statement.

WARNING:
The tasks listed below for this product and optional product provided by Fujitsu should be performed only by authorized service personnel.

The user must not perform these tasks. Incorrect operation of these tasks may cause electric shock, injury, or fire.

- Installation and reinstallation of all components
- Removal of front, rear, or side covers
- Mounting/unmounting of optional internal devices
- Connecting/disconnecting of external interface cables
- Maintenance (repair and regular diagnosis and maintenance)

Also, important alert messages are shown in "Important Alert Messages" on page xxv.

Notes on Safety

Important Alert Messages

This manual provides the following important alert signals:

Caution – The WARNING signal indicates a dangerous situation could result in death or serious injury if the user does not perform the procedure correctly.

Task	Warning
Normal operation	**Electric shock, fire** Do not damage, break, or modify the power cords. Cord damage may cause electric shock or fire.

Caution – The CAUTION signal indicates a hazardous situation could result in minor or moderate personal injury if the user does not perform the procedure correctly. This signal also indicates that damage to the product or other property may occur if the user does not perform the procedure correctly.

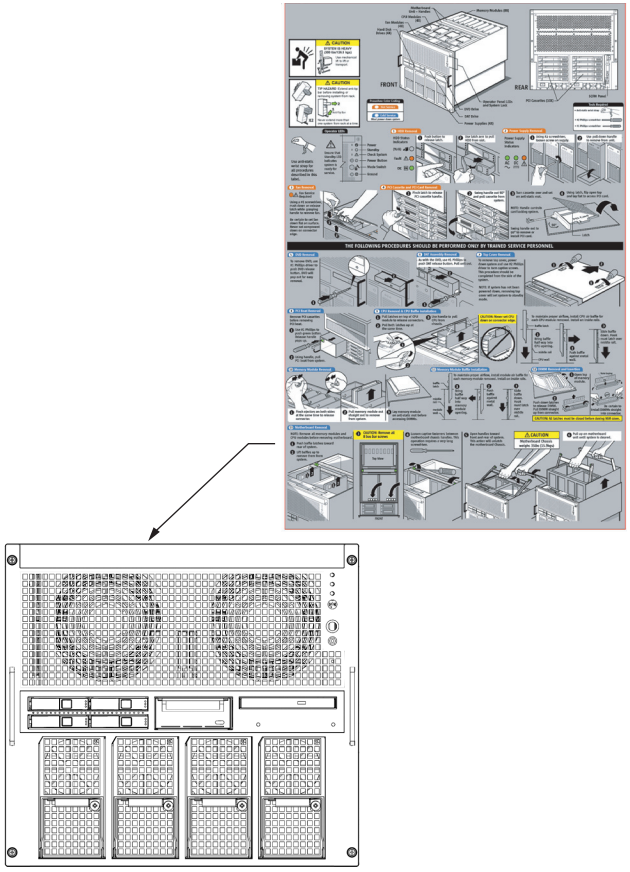
Task	Warning
Normal operation	**Equipment damage** Be sure to follow the precautions below when installing the main unit. Otherwise, the equipment may be damaged. • Do not block ventilation slits. • Avoid installing the equipment in a place exposed to direct sunlight or near equipment that becomes extremely hot. • Avoid installing the equipment in a dusty place or a place directly exposed to corrosive gas or salty air. • Avoid installing the equipment in a place exposed to strong vibration. Also, install the equipment on a level surface so that it is stable. • The equipment can be grounded using shared grounding. However, the grounding method varies with the building where it is installed. Be sure to confirm the related standards to ground the equipment correctly. • Do not run any cable beneath any equipment. Also, prevent cables from becoming taut. Never disconnect any power cord from the equipment while power is being supplied to the equipment. • Do not place anything on top of the main unit. Do not use the main unit as a workspace. • Avoid exposing the equipment to rapid changes in the ambient temperature, such as a rapid increase during transport in winter. A rapid increase in the ambient temperature causes moisture to condense in the equipment. Use the equipment only after the difference between its temperature and the ambient temperature is negligible. • Avoid installing the equipment near a copy machine, air conditioner, or welding machine, which is noisy. • Take preventive action to minimize static electricity at the installation location. Note that static electricity is easily generated in some carpets and can cause the equipment to malfunction. • Confirm that the power supply voltage and frequency during operation match the rated values indicated on the equipment. • Do not insert any object into an opening in the equipment. Components inside the equipment use high voltage. Conductive foreign matter, such as a metal object, inserted into the equipment, may cause a short circuit between components, resulting in fire, electric shock, or equipment damage. • For maintenance of the equipment, contact your authorized service personnel.

Task	Warning
Normal operation	**Data destruction** Confirm the items listed below before turning off the power. Otherwise, data may be destroyed. • All applications have completed processing. • No user is using the equipment. • When the main unit power is turned off, the POWER LED on the operation panel is turned off. Be sure to confirm that the POWER LED is off before turning off the main power (uninterruptible power supply [UPS], power distribution box, etc.). If necessary, back up files before turning off the system power. **Data destruction** Do not forcibly stop a domain that is operating normally. Otherwise, data may be destroyed. **Data destruction** Do not disconnect the power cord from the AC power input while power is being supplied. Otherwise, data stored on hard disk units may be destroyed.

Alert Labels

The followings are labels attached to this product:

- Never peel off the labels.



FF2 (Front View)

Product Handling

Maintenance

Caution – Certain tasks in this manual should only be performed by a certified service engineer. User must not perform these tasks. Incorrect operation of these tasks may cause electric shock, injury, or fire.

- Installation and reinstallation of all components, and initial settings
- Removal of front, rear, or side covers
- Mounting/de-mounting of optional internal devices
- Plugging or unplugging of external interface cards
- Maintenance and inspections (repairing, and regular diagnosis and maintenance)

Caution – The following tasks regarding this product and the optional products provided from Fujitsu should only be performed by a certified service engineer. Users must not perform these tasks. Incorrect operation of these tasks may cause malfunction.

- Unpacking optional adapters and such packages delivered to the users
- Plugging or unplugging of external interface cards

Remodeling/Rebuilding

Caution – Any modification and/or recycling of this product and its components may be carried out only by a certified service engineer and must not be done by the customer under any circumstances. Otherwise, electric shock, injury or fire may result.

Emission of Laser Beam (Invisible)

Caution – The main unit contains modules that generate invisible laser radiation. Laser beams are generated while the equipment is operating, even if an optical cable is disconnected or a cover is removed. Do not look at any light-emitting part directly or through an optical apparatus (e.g., magnifying glass, microscope).

Limitations and Cautions

Power Control and Operator Panel Mode Switch

When you use the remote power control utilizing the RCI function or the automatic power control system (referred to below as APCS), you can disable this remote power control or the APCS by switching to Service mode on the operator panel.

Disabling these features ensures that you do not unintentionally switch the system power on or off during maintenance. Note system power off with the APCS cannot be disabled with the mode switch. Therefore, be sure to turn off automatic power control via APCS before starting maintenance.

If you switch the mode while using the RCI or the automatic power control, the system power is controlled as follows.

Function	Mode switch	
	Locked	Service
RCI	Remote power-on/power-off operations are enabled.	Remote power-on/power-off operations are disabled.
Automatic power control	Automatic power-on/power-off operations are enabled.	Automatic power-on is disabled, but power-off remains enabled.

To use the RCI function, see the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI Build Procedure* and the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers RCI User's Guide* which are available on the website of manuals.

To use the APCS, see the *Enhanced Support Facility User's Guide for Machine Administration Automatic Power Control Function (Supplement Edition)*.

Fujitsu Welcomes Your Comments

If you have any comments or requests regarding this document, or if you find any unclear statements in the document, please state your points specifically on the form at the following URL.

For Users in U.S.A., Canada, and Mexico:

http://www.computers.us.fujitsu.com/www/support_servers.shtml?support/servers

For Users in Other Countries:

SPARC Enterprise contact

http://www.fujitsu.com/global/contact/computing/sparce_index.html

CHAPTER 1

Safety and Tools

This chapter describes safety and tools information. The information is organized into the following topics:

- "Safety Precautions" on page 1-1
- "System Precautions" on page 1-2
- "System Precautions" on page 1-2

1.1 Safety Precautions

To protect both yourself and the equipment, observe the following safety precautions.

TABLE 1-1 ESD Precautions

Item	Problem	Precaution
ESD jack/wrist or foot strap	Electrostatic Discharge (ESD)	Connect the ESD connector to your server and wear the wrist strap or foot strap when handling printed circuit boards. There are two antistatic strap attachment points on the chassis: 1. Right side towards the front 2. Left side towards the rear
ESD mat	ESD	An approved ESD mat provides protection from static damage when used with a wrist strap or foot strap. The mat also cushions and protects small parts that are attached to printed circuit boards.
ESD packaging box	ESD	Place the board or component in the ESD safe packaging box after you remove it.

Caution – Attach the cord of the antistatic wrist strap directly to the server. Do not attach the antistatic wrist strap to the ESD mat connection.

The antistatic wrist strap and any components you remove must be at the same potential.

1.2 System Precautions

For your protection, observe the following safety precautions when servicing your equipment:

- Follow all cautions, warnings, and instructions marked on the equipment.
- Never push objects of any kind through openings in the equipment, as they might touch dangerous voltage points or short out components that could result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

1.2.1 Electrical Safety Precautions

Ensure that the voltage and frequency of the power outlet to be used match the electrical rating labels on the equipment.

Wear antistatic wrist straps when handling any magnetic storage devices, system boards, or other printed circuit boards.

Use only properly grounded power outlets as described in the *SPARC Enterprise M4000/M5000 Servers Installation Guide*.

Caution – *Do not* make mechanical or electrical modifications. The manufacturer is not responsible for regulatory compliance of modified servers.

1.2.2 Equipment Rack Safety Precautions

All equipment racks should be anchored to the floor, ceiling, or to adjacent frames, using the manufacturer's instructions.

Free-standing equipment racks should be supplied with a stabilizer feature, which must be sufficient to support the weight of the server when extended on its slides. This prevents instability during installation or service actions.

Where a stabilizer feature is not supplied and the equipment rack is not bolted to the floor, a safety evaluation must be conducted by the installation or service engineer. The safety evaluation determines stability when the server is extended on its slides, prior to any installation or service activity.

Prior to installing the equipment rack on a raised floor, a safety evaluation must be conducted by the installation or service engineer. The safety evaluation ensures that the raised floor has sufficient strength to withstand the forces upon it when the server is extended on its slides. The normal procedure in this case would be to fix the rack through the raised floor to the concrete floor below, using a proprietary mounting kit for the purpose.

Caution – If more than one server is installed in an equipment rack, service only one server at a time.

1.2.3 Filler Boards and Filler Panels

Filler boards and panels, which are physically inserted into the server when a board or module has been removed are used for EMI protection and for air flow.

1.2.4 Handling Components

Caution – There is a separate ground located on the rear of the server. It is important to ensure that the server is properly grounded.

Caution – The server is sensitive to static electricity. To prevent damage to the board, connect an antistatic wrist strap between you and the server.

Caution – The boards have surface-mount components that can be broken by flexing the boards.

To minimize the amount of board flexing, observe the following precautions:

- Hold the board by the handle and finger hold panels, where the board stiffener is located. Do not hold the board at the ends.
- When removing the board from the packaging, keep the board vertical until you lay it on the cushioned ESD mat.
- Do not place the board on a hard surface. Use a cushioned antistatic mat. The board connectors and components have very thin pins that bend easily.
- Be careful of small component parts located on both sides of the board.
- Do not use an oscilloscope probe on the components. The soldered pins are easily damaged or shorted by the probe point.
- Transport the board in its packaging box.

Caution – The heat sinks can be damaged by incorrect handling. Do not touch the heat sinks while replacing or removing boards. If a heat sink is loose or broken, obtain a replacement board. When storing or shipping a board, ensure that the heat sinks have sufficient protection.

Caution – On the PCI cassette, when removing cables such as LAN cable, if your finger can't reach the latch lock of the connector, press the latch with a flathead screwdriver to remove the cable. Forcing your finger into the clearance can cause damage to the PCI card.

CHAPTER 2

Fault Isolation

This chapter describes overview and fault diagnosis information. The information is organized into the following topics:

- "Determining Which Diagnostics Tools to Use" on page 2-1
- "Checking the Server and System Configuration" on page 2-4
- "Operator Panel" on page 2-9
- "Error Conditions" on page 2-14
- "LED Functions" on page 2-18
- "Using the Diagnostic Commands" on page 2-21
- "Traditional Solaris Diagnostic Commands" on page 2-26
- "Other Issues" on page 2-37

2.1 Determining Which Diagnostics Tools to Use

When a failure occurs, a message is often displayed on the monitor. Use the flowcharts in FIGURE 2-1 and FIGURE 2-2 to find the correct methods for diagnosing problems.

FIGURE 2-1 Diagnostic Method Flow Chart

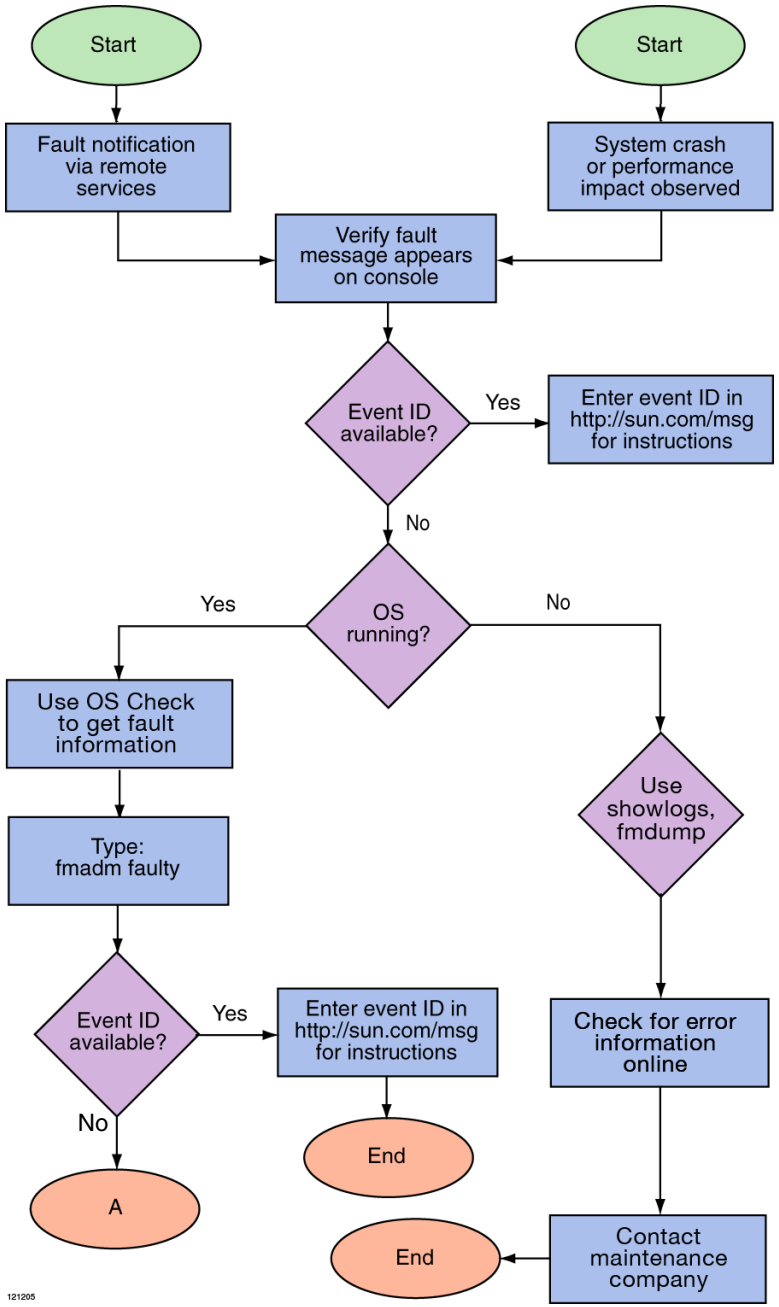
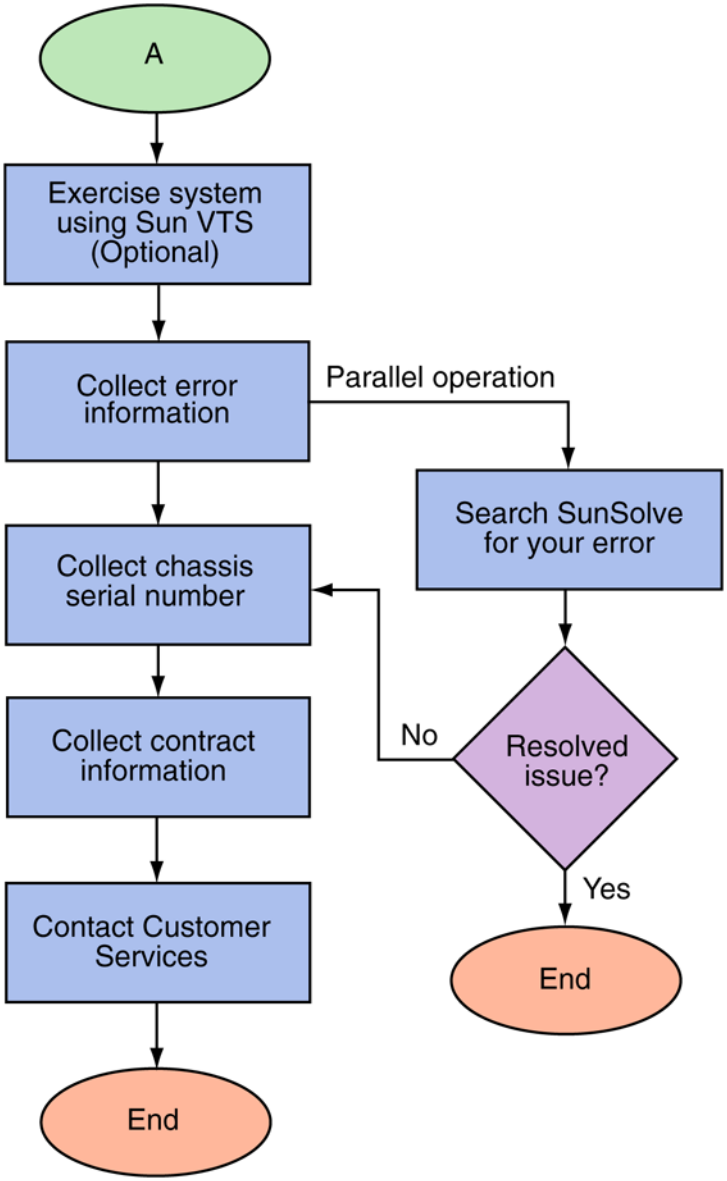


FIGURE 2-2 Diagnostic Method Flow Chart—Traditional Data Collection



2.2 Checking the Server and System Configuration

Before and after maintenance work, the state and configuration of the server and components should be checked and the information saved. For recovery from a problem, conditions related to the problem and the repair status must be checked. The operating conditions must remain the same before and after maintenance.

A functioning server without any problems should not display any error conditions. For example:

- The `syslog` file should not display error messages.
- The XSCF Shell command `showhardconf` does not display the * mark .
- The administrative console should not display error messages.
- The server processor logs should not display any error messages.
- The Solaris™ Operating System message files should not indicate any additional errors.

2.2.1 Checking the Hardware Configuration and FRU Status

To replace a faulty component and perform the maintenance on the server it is important to check and understand the hardware configuration of the server and the state of each hardware component.

The hardware configuration refers to information that indicates to which layer a component belongs in the hardware configuration.

The status of each hardware component refers to information on the condition of the standard or optional component in the server: temperature, power supply voltage, CPU operating conditions, and other times.

The hardware configuration and the status of each hardware component can be checked from the maintenance terminal using eXtended System Control Facility (XSCF) Shell commands, as shown in the following table.

TABLE 2-1 Commands for Checking Hardware Configuration

Command	Description
`showhardconf`	Displays hardware configuration.
`showstatus`	Displays the status of a component. This command is used when only a faulty component is checked.
`showboards`	Displays the status of devices and resources.
`showdcl`	Displays the hardware resource configuration information of a domain.
`showfru`	Displays the setting information of a device.

Also some conditions can be checked based on the On or blinking state of the component LEDs (see TABLE 2-3).

2.2.1.1 Checking the Hardware Configuration

Login authority is required to check the hardware configuration. The following procedure for these checks can be made from the maintenance terminal:

1. **Log in with the account of the XSCF hardware maintenance engineer.**
2. **Type** `showhardconf`**.**

```
XSCF> showhardconf
```

The `showhardconf` command prints the hardware configuration information to the screen. See the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for more detailed information.

2.2.2 Checking the Software and Firmware Configuration

The software and firmware configurations and versions affect the operation of the server. To change the configuration or investigate a problem, check the latest information and check for any problems in the software.

Software and firmware varies according to users:

- The software configuration and version can be checked in the Solaris OS. Refer to the Solaris 10 documentation for more information.
- The firmware configuration and versions can be checked from the maintenance terminal using XSCF Shell commands. Refer to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for more detailed information.

Check the software and firmware configuration information with assistance from the system administrator. However, if you have received login authority from the system administrator, the commands shown in the table can be used from the maintenance terminal for these checks.

TABLE 2-2 Commands for Checking Software and Firmware Configuration

Command	Description
`showrev(1M)`	System administration command that displays information system patches.
`uname(1)`	System administration command that outputs the current system information.
`version(8)`	XSCF Shell command that outputs the current firmware version information.
`showhardconf(8)`	XSCF Shell command that indicates information on components mounted on the server.
`showstatus(8)`	XSCF Shell command that displays the status of a component. This command is used when only a faulty component is to be checked.

TABLE 2-2 Commands for Checking Software and Firmware Configuration *(Continued)*

Command	Description
`showboards(8)`	XSCF Shell command that indicates information on eXtended system board (XSB). It can indicate information on XSB that belongs to the specified domain and information on all XSBs mounted. The eXtended System Board (XSB) combines the hardware resources of a physical system board. The SPARC Enterprise servers can generate one (Uni-XSB) or four (Quad-XSB) XSB(s) from one physical system board.
`showdcl(8)`	XSCF Shell command that displays the configuration information of a domain (hardware resource information).
`showfru(8)`	XSCF Shell command that displays the setting information of a device.

2.2.2.1 Checking the Software Configuration

The following procedure for these checks can be made from the domain console:

1. **Type** `showrev`**.**

```
# showrev
```

The `showrev` command prints the system configuration information to the screen.

2.2.2.2 Checking the Firmware Configuration

Login authority is required to check the firmware configuration. The following procedure for these checks can be made from the maintenance terminal:

1. **Log in with the account of the XSCF hardware maintenance engineer.**
2. **Type** `version(8)`**.**

```
XSCF> version(8)
```

The `version(8)` command prints the firmware version information to the screen. See the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for more detailed information.

2.2.3 Downloading the Error Log Information

If you want to download the error log information, use the XSCF log fetch function. The eXtended System Control facility unit (XSCFU) has an interface with external units so that a maintenance engineer can easily obtain useful maintenance information such as error logs

Connect the maintenance terminal, and use the command-line interface (CLI) or browser user interface (BUI) to issue a download instruction to the maintenance terminal to download Error Log information over the XSCF-LAN.

2.3 Operator Panel

When no network connection is available the operator panel is used to start or stop the server. The operator panel displays three LED status indicators, a Power switch, and a security keyswitch. The panel is located on the front of the server, in the upper right.

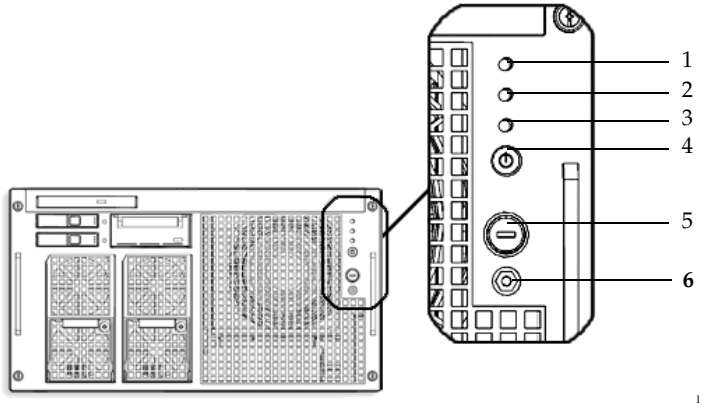
When the server is running, the Power and XSCF STANDBY LEDs (green) should be lit and the CHECK LED (amber) should not be lit. If the CHECK LED is lit, search the system logs to determine what is wrong.

The three LED status indicators on the operator panel provide the following:

- General system status
- System problem alerts
- Location of the system fault

FIGURE 2-3 and FIGURE 2-4 show the operator panel.

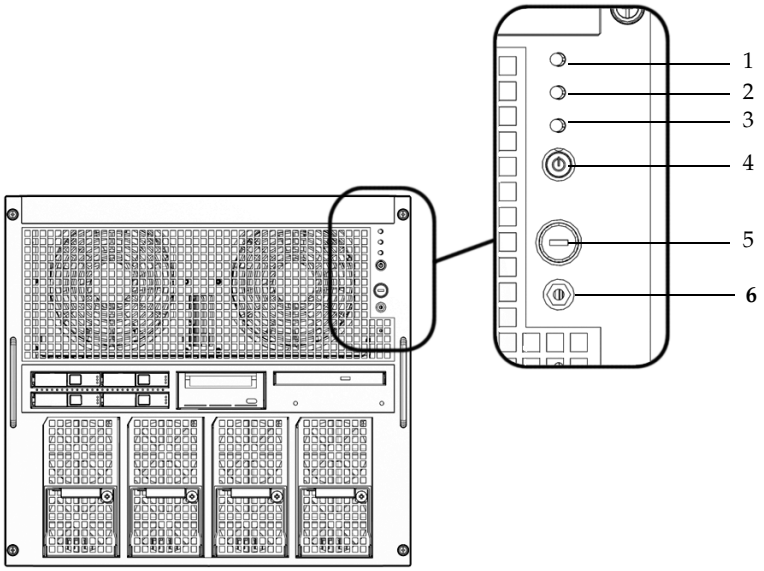
FIGURE 2-3 SPARC Enterprise M4000 Operator Panel



Location Number	Component
1	POWER LED
2	XSCF STANDBY LED
3	CHECK LED
4	Power switch
5	Mode switch (keyswitch)

Location Number	Component
6	Antistatic ground socket

FIGURE 2-4 SPARC Enterprise M5000 Operator Panel



Location Number	Component
1	POWER LED
2	XSCF STANDBY LED
3	CHECK LED
4	Power switch
5	Mode switch (keyswitch)
6	Antistatic ground socket

Additional LEDs are located in various locations in the server. For more information about LED indicator locations, see Section 2.5, “LED Functions” on page 2-18.

The Operator panel LEDs operate as described in TABLE 2-3.

TABLE 2-3 Operator Panel LEDs and Switches

Icon	Name	Color	Description
	POWER LED	Green	Indicates the server power status. • On: Server has power. • Off: Server is without power. • Blinking: The power-off sequence is in progress.
	XSCF STANDBY LED	Green	Indicates the readiness of the XSCF. • On: XSCF unit is functioning normally. • Off: XSCF unit is stopped. • Blinking: Under system initialization after server power-on, or under system power-on process.
	CHECK LED	Amber	Indicates that server detected a fault. • On: Error detected that disables the startup. • Off: Normal, or server power-off (power failure). • Blinking: Indicates the position of fault.
	Power switch		Switch to direct server power on/power off.
	Mode switch (keyswitch)		The Locked setting: • Normal key position. Power on is available with the Power switch, but power off is not. • Disables the Power switch to prevent unauthorized users from powering the server on or off. • The Locked position is the recommended setting for normal day-to-day operations.
			The Service setting: • Service should be provided at this position. • Power on and off is available with Power switch. • The key cannot be pulled out at this position.

The state displayed by LED combination is described in TABLE 2-4.

TABLE 2-4 State Display by LED Combination (Operator Panel)

LED			
POWER	**XSCF STANDBY**	**CHECK**	**Description of the state**
Off	Off	Off	The circuit breaker is switched off.
Off	Off	On	The circuit breaker is switched on.
Off	Blinking	Off	The XSCF is being initialized.
Off	Blinking	On	An error occurred in the XSCF.
Off	On	Off	The XSCF is on standby. The system is waiting for power-on of the air conditioning system.
On	On	Off	Warm-up standby processing is in progress (power-on is delayed). The power-on sequence is in progress. The system is in operation.
Blinking	On	Off	The power-off sequence is in progress. Fan termination is being delayed.

The operator panel *mode* switch is used to set the operation mode. The operator panel *power* switch is used to power on and off the server. TABLE 2-6 lists the settings and corresponding functions of the mode switch on the operator panel.

TABLE 2-5 Switches (Operator Panel)

Name		Description of Function
Mode switch	Used to set an operation mode for the server. Insert the special key that is under the customer's control, to switch between modes.	
	Locked	Normal operation mode. The system can be powered on with the power switch, but it cannot be powered off with the power switch. The key can be pulled out at this key position.
	Service	Mode for maintenance. The system can only be powered on and off with the power switch. The key cannot be pulled out at this key position. Maintenance is performed in Service mode while the server is stopped. Because remote power control and automatic power control of the server are disabled in Service mode, unintentional power on can be prevented.
Power switch	Used to control the server power. Power on and power off are controlled by pressing this switch in different patterns, as described below.	
	Holding down for a short time (less than 4 seconds)	Regardless of the mode switch state, the server (all domains) is powered on. At this time, processing for waiting for facility (air conditioners) power on and warm-up completion is skipped.
	Holding down for a long time in Service mode (4 seconds or longer)	If power to the server is on (at least one domain is operating), shutdown processing is executed for all domains before the system is powered off. If the system is being powered on, the power-on processing is cancelled, and the system is powered off. If the system is being powered off, the operation of the Power switch is ignored, and the power-off processing is continued.

TABLE 2-6 Meanings of the Mode Switch

Function	Mode Switch	
State Definition	**Locked**	**Service**
Inhibition of Break Signal Reception	Enabled. Reception of the break signal can be enabled or disabled for each domain using `setdomainmode`.	Disabled
Power On/Off by power switch	Only power on is enabled	Enabled

2.4 Error Conditions

Always access the following web site first to interpret faults and obtain information on FMA messages.

`http://www.sun.com/msg`

This web site can be used in the event of a Solaris or domain failure or to look up specific FMA error messages it will not provide details on XSCF errors.

The web site directs you to provide the message ID that your software displayed. The web site then provides knowledge articles about the fault and corrective action to resolve the fault. The fault information and documentation at this web site is updated regularly.

Predictive self-healing is an architecture and methodology for automatically diagnosing, reporting, and handling software and hardware fault conditions. This new technology lessens the time required to debug a hardware or software problem and provides the administrator and technical support with detailed data about each fault.

2.4.1 Predictive Self-Healing Tools

In the Solaris 10 software, the fault manager runs in the background. If a failure occurs, the system software recognizes the error and attempts to determine what hardware is faulty. The software also takes steps to prevent that component from being used until it has been replaced. Some of the specific actions the software takes include:

- Receives telemetry information about problems detected by the system software.

- Diagnoses the problems.
- Initiates pro-active self-healing activities. For example, the fault manager can disable faulty components.
- When possible, causes the faulty FRU to provide an LED indication of a fault in addition to populating the system console messages with more details.

TABLE 2-7 shows a typical message generated when a fault occurs. The message appears on your console and is recorded in the `/var/adm/messages` file.

Note – The message in TABLE 2-7 indicates that the fault has already been diagnosed. Any corrective action that the system can perform has already taken place. If your server is still running, it continues to run.

TABLE 2-7 Predictive Self-Healing Message

Output Displayed	Description
`Nov 1 16:30:20 dt88-292 EVENT-TIME: Tue Nov 1 16:30:20 PST 2005`	EVENT-TIME: the time stamp of the diagnosis.
`Nov 1 16:30:20 dt88-292 PLATFORM: SUNW,A70, CSN: -, HOSTNAME: dt88-292`	PLATFORM: A description of the server encountering the problem.
`Nov 1 16:30:20 dt88-292 SOURCE: eft, REV: 1.13`	SOURCE: Information on the Diagnosis Engine used to determine the fault.
`Nov 1 16:30:20 dt88-292 EVENT-ID: afc7e660-d609-4b2f-86b8-ae7c6b8d50c4`	EVENT-ID: The Universally Unique event ID for this fault.
`Nov 1 16:30:20 dt88-292 DESC:` `Nov 1 16:30:20 dt88-292 A problem was detected in the PCI-Express subsystem`	DESC: A basic description of the failure.
`Nov 1 16:30:20 dt88-292 Refer to http://sun.com/msg/SUN4-8000-0Y for more information.`	WEB SITE: Where to find specific information and actions for this fault.
`Nov 1 16:30:20 dt88-292 AUTO-RESPONSE: One or more device instances may be disabled.`	AUTO-RESPONSE: What, if anything, the system did to alleviate any follow-on issues.
`Nov 1 16:30:20 dt88-292 IMPACT: Loss of services provided by the device instances associated with this fault.`	IMPACT: A description of what that response might have done.
`Nov 1 16:30:20 dt88-292 REC-ACTION: Schedule a repair procedure to replace the affected device. Use Nov 1 16:30:20 dt88-292 fmdump -v -u EVENT_ID to identify the device or contact Sun for support.`	REC-ACTION: A short description of what the system administrator should do.

2.4.2 Monitoring Output

To understand error conditions, collect the monitoring output information. For the collection of the information, use the commands shown in TABLE 2-8.

TABLE 2-8 Commands for Checking the Monitoring Output

Command	Operand	Description
`showlogs(8)`	`console`	Displays console of Domain.
	`monitor`	Logs messages that are displayed in the message window.
	`panic`	Logs output to the console during a panic.
	`ipl`	Collects console data generated during the period of the power on of a domain to the completion of the operating system start.

2.4.3 Messaging Output

To understand error conditions, collect messaging output information, use the commands shown in TABLE 2-9.

TABLE 2-9 Commands for Checking the Messaging Output

Command	Operand	Description
`showlogs`	`env`	Displays the temperature history log. The environmental temperature data and power status are indicated in 10-minute intervals. the data is stored for a maximum of six months.
	`power`	Displays the power and reset information.
	`event`	Displays information reported to the operating system and stored as event logs.
	`error`	Displays error logs.
`fmdump(1M)` `fmdump(8)`		Displays fault management architecture diagnostic results and errors. It is provided as a Solaris command and XSCF Shell command.

Each error message logged by the predictive self-healing architecture has a code associated with it as well as a web address that can be followed to get the most up-to-date course of action for dealing with that error.

Refer to the Solaris 10 documentation for more information on predictive self-healing.

2.5 LED Functions

LED lights help the user find the component and provide information on the state of the component.

This section explains the LEDs of each component that are to be checked when a component is replaced. Most components are equipped with LEDs that help indicate which component has the error and an LED to indicate whether the component can be removed.

Some components, such as DIMMs, do not have LEDs. The state of a component without LEDs can be checked using the `showhardconf` and `ioxadm` XSCF Shell commands from the maintenance terminal. See the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for more detailed information.

TABLE 2-10 describes the LEDs and their functions.

TABLE 2-10 Component LEDs

LED Name	Display and Meaning	
READY (green)	Indicates whether the component is operating.	
	On	Indicates that the component is operating. The component cannot be disconnected and removed from the server while the READY LED is On.
	Blinking	Indicates that the component is being configured (or disconnected). For an XSCF unit it indicates that it is being initialized.
	Off	Indicates that the component is stopped. The component can be disconnected and replaced.
CHECK (amber)	Indicates that the component contains an error or that the component is a target for replacement.	
	On	Indicates that an error has been detected.
	Blinking	Indicates that the component is ready to be replaced. The blinking LED acts as a locator.
	Off	Indicates no known error exists.

TABLE 2-11 describes the components and their LEDs.

TABLE 2-11 Component LED Descriptions

Component	LED Type	LED Display	Meaning
XSCF unit	ACTIVE	On (green)	Indicates that the XSCF unit is active.
		Off	Indicates that the XSCF unit is on standby.
XSCF unit and IO (display part for LAN)	ACTIVE	On (green)	Indicates that the communication is being performed through the LAN port.
		Off	Indicates that no communication is being performed through the LAN port.
	LINK SPEED	On (amber)	Indicates that the communication speed for the LAN port is 1G bps.
		On (green)	Indicates that the communication speed for the LAN port is 100M bps.
		Off	Indicates that the communication speed for the LAN port is 10M bps.
PCI slot	POWER	On (green)	Indicates that the power to the PCI slot is turned on. The PCI card cannot be removed.
		Off	Indicates that the power to the PCI slot is turned off. The PCI card can be removed.
	ATTENTION	On (amber)	Indicates that an error occurred in the PCI slot.
		Blinking (amber)	Indicates that the card in this PCI slot is a target device for replacement.
		Off	Indicates the normal state of the PCI slot.

TABLE 2-11 Component LED Descriptions *(Continued)*

Component	LED Type	LED Display	Meaning
Power supply unit (PSU)	READY	On (green)	Indicates that the power is turned on and being supplied.
		Blinking (green)	Indicates that the power is being supplied to the power supply unit, but the power supply unit is not turned on.
		Off	Indicates that power is not being supplied to the power supply unit.
	CHECK	On (amber)	Indicates that an error occurred in the power supply unit.
		Off	Indicates the normal state of the power supply unit.
	LED_AC	On (green)	Power supply unit has AC applied and is supplying 12V.
		Off	Indicates that AC is out of the specified operating range and 12V is not being supplied from the power supply unit.
	LED_DC	On (green)	Power supply unit has AC applied and is supplying 48V. Standby pinhole provides a manual backup to turn off 48V power.
		Off	Indicates that 48V is not being supplied from the power supply unit.
Fan	ATTENTION	On (amber)	Indicates that an error occurred.
		Blinking (amber)	Indicates that the fan is a target device for replacement.

2.6 Using the Diagnostic Commands

After the message in TABLE 2-7 is displayed, you might desire more information about the fault. For complete information about troubleshooting commands, refer to the Solaris 10 man pages or the XSCF Shell man pages. This section describes some details of the following commands:

- `showlogs`
- `fmdump`
- `fmadm`
- `fmstat`

2.6.1 Using the `showlogs` Command

The `showlogs` command displays the contents of a specified log in order of time stamp starting with the oldest date. The `showlogs` command displays the following logs:

- error log
- power log
- event log
- temperature and humidity record
- monitoring message log
- console message log
- panic message log
- IPL message log

An example of the `showlogs` output.

```
XSCF> showlogs error
Date: Oct 03 17:23:11 UTC 2006     Code: 80002000-ccff0000-0104340100000000
    Status: Alarm                  Occurred: Oct 03 17:23:10.868 UTC 2006
    FRU: /FAN_A#0
    Msg: Abnormal FAN rotation speed. Insufficient rotation
XSCF>
```

2.6.2 Using the fmdump Command

The fmdump command can be used to display the contents of any log files associated with the Solaris fault manager.

The fmdump command produces output similar to CODE EXAMPLE 2-1. This example assumes there is only one fault.

CODE EXAMPLE 2-1 fmdump Output

```
# fmdump
TIME                 UUID                                 SUNW-MSG-ID
Nov 02 10:04:15.4911 0ee65618-2218-4997-c0dc-b5c410ed8ec2 SUN4-8000-0Y
```

2.6.2.1 fmdump -V Command

You can obtain more detail by using the -V option.

```
# fmdump -V -u  0ee65618-2218-4997-c0dc-b5c410ed8ec2
TIME                 UUID                                  SUNW-MSG-ID
Nov 02 10:04:15.4911 0ee65618-2218-4997-c0dc-b5c410ed8ec2  SUN4-8000-0Y
100% fault.io.fire.asic
FRU: hc://product-id=SUNW,A70/motherboard=0
rsrc: hc:///motherboard=0/hostbridge=0/pciexrc=0
```

At least three lines of new output are delivered to the user with the -V option.

- The first line is a summary of information you have seen before in the console message but includes the time stamp, the UUID and the Message-ID.
- The second line is a declaration of the certainty of the diagnosis. In this case we are 100 percent sure the failure is in the ASIC described. If the diagnosis might involve multiple components you might see two lines here with 50% in each (for example)
- The FRU line declares the part that needs to be replaced to return the server to a fully operational state.
- The rsrc line describes which component was taken out of service as a result of this fault.

2.6.2.2 `fmdump -e` Command

To get information of the errors that caused this failure you can use the `-e` option, as shown in the following example.

```
XSCF> fmdump -e
TIME                 CLASS
Oct 03 13:52:48.9532 ereport.fm.fmd.module
Oct 03 13:52:48.9610 ereport.fm.fmd.module
Oct 03 13:52:48.9674 ereport.fm.fmd.module
Oct 03 13:52:48.9738 ereport.fm.fmd.module
```

2.6.3 Using the `fmadm faulty` Command

The `fmadm faulty` command can be used by administrators and service personnel to view and modify system configuration parameters that are maintained by the Solaris fault manager. The command is primarily used to determine the status of a component involved in a fault, as shown in the following example.

```
# fmadm faulty
STATE RESOURCE / UUID
-------- ------------------------------------------------------
degraded dev:////pci@1e,600000
     0ee65618-2218-4997-c0dc-b5c410ed8ec2
# fmadm repair
     0ee65618-2218-4997-c0dc-b5c410ed8ec2
```

The PCI device is degraded and is associated with the same UUID as seen above. You might also see “faulted” states.

2.6.3.1 `fmadm repair` Command

If `fmadm faulty` occurs, the faulty FRU (CPU, memory, or I/O unit) is replaced, and then the fmadm `repair` command needs to be executed to clear FRU information on the domain. If the `fmadam repair` command is not executed, error messages continue to be output.

If `fmadm faulty` occurs, the FMA resource cache on the OS side can be cleared without problems; the data in it need not match the hardware failure information retained on the XSCF side.

```
# fmadm repair
STATERESOURCE / UUID
-------- -----------------------------------------------------
degraded dev:////pci@1e,600000
     0ee65618-2218-4997-c0dc-b5c410ed8ec2
```

2.6.3.2 `fmadm config` Command

The `fmadm config` command output shows you the version numbers of the diagnosis engines in use by your server, as well as their current state. You can check these versions against information on the SunSolve web site to determine if you are running the latest diagnostic engines, as shown in the following example.

```
XSCF> fmadm config
MODULE                   VERSION STATUS  DESCRIPTION
eft                      1.16    active  eft diagnosis engine
event-transport          2.0     active  Event Transport Module
faultevent-post          1.0     active  Gate Reaction Agent for errhandd
fmd-self-diagnosis       1.0     active  Fault Manager Self-Diagnosis
iox_agent                1.0     active  IO Box Recovery Agent
reagent                  1.1     active  Reissue Agent
sysevent-transport       1.0     active  SysEvent Transport Agent
syslog-msgs              1.0     active  Syslog Messaging Agent
XSCF>
```

2.6.4 Using the `fmstat` Command

The `fmstat` command can report statistics associated with the Solaris fault manager. The `fmstat` command shows information about DE performance. In the example below, the fmd-self-diagnosis DE (also seen in the console output) has received an event which it accepted. A case is “opened” for that event and a diagnosis is performed to “solve” the cause for the failure. See the following example.

```
XSCF> fmstat
module             ev_recv ev_acpt wait  svc_t  %w  %b  open solve  memsz  bufsz
eft                      0       0  0.0    0.0   0   0     0     0   3.3M      0
event-transport          0       0  0.0    0.0   0   0     0     0   6.4K      0
faultevent-post          2       0  0.0    8.9   0   0     0     0      0      0
fmd-self-diagnosis      24      24  0.0  352.1   0   0     1     0    24b      0
iox_agent                0       0  0.0    0.0   0   0     0     0      0      0
reagent                  0       0  0.0    0.0   0   0     0     0      0      0
sysevent-transport       0       0  0.0 8700.4   0   0     0     0      0      0
syslog-msgs              0       0  0.0    0.0   0   0     0     0    97b      0
XSCF>
```

2.7 Traditional Solaris Diagnostic Commands

These superuser commands can help you determine if you have issues in your workstation, in the network, or within another server that you are networking with.

The following commands are described in this section:

- "Using the iostat Command" on page 2-27
- "Using the prtdiag Command" on page 2-28
- "Using the prtconf Command" on page 2-30
- "Using the netstat Command" on page 2-32
- "Using the ping Command" on page 2-34
- "Using the ps Command" on page 2-35
- "Using the prstat Command" on page 2-36

Most of these commands are located in the `/usr/bin` or `/usr/sbin` directories.

Note – For additional details, options, examples, and the most up to date information for each command refer to that command's man page.

2.7.1 Using the `iostat` Command

The `iostat` command iteratively reports terminal, drive, and tape I/O activity, as well as CPU utilization.

2.7.1.1 Options

TABLE 2-12 describes options for the `iostat` command and how those options can help troubleshoot the server.

TABLE 2-12 Options for `iostat`

Option	Description	How It Can Help
No option	Reports status of local I/O devices.	A quick three-line output of device status.
`-c`	Reports the percentage of time the system has spent in user mode, in system mode, waiting for I/O, and idling.	Quick report of CPU status.
`-e`	Displays device error summary statistics. The total errors, hard errors, soft errors, and transport errors are displayed.	Provides a short table with accumulated errors. Identifies suspect I/O devices.
`-E`	Displays all device error statistics.	Provides information about devices: manufacturer, model number, serial number, size, and errors.
`-n`	Displays names in descriptive format.	Descriptive format helps identify devices.
`-x`	For each drive, reports extended drive statistics. The output is in tabular form.	Similar to the `-e` option, but provides rate information. This helps identify poor performance of internal devices and other I/O devices across the network.

The following example shows output for one `iostat` command.

```
# iostat -En
c0t0d0           Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: SEAGATE  Product: ST973401LSUN72G  Revision: 0556 Serial No: 0521104T9D
Size: 73.40GB <73400057856 bytes>
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 0 Predictive Failure Analysis: 0
c0t1d0           Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: SEAGATE  Product: ST973401LSUN72G  Revision: 0556 Serial No: 0521104V3V
Size: 73.40GB <73400057856 bytes>
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 0 Predictive Failure Analysis: 0
#
```

2.7.2 Using the `prtdiag` Command

The `prtdiag` command displays configuration and diagnostic information. The diagnostic information identifies any failed component.

The `prtdiag` command is located in the `/usr/platform/`*platform-name*`/sbin/` directory.

Note – The `prtdiag` command might indicate a slot number different than that identified elsewhere in this document. This is normal.

2.7.2.1 Options

TABLE 2-13 describes options for the `prtdiag` command and how those options can help troubleshooting.

TABLE 2-13 Options for `prtdiag`

Option	Description	How It Can Help
No option	Lists components.	Identifies CPU timing and PCI cards installed.
`-v`	Verbose mode. Displays the time of the most recent AC power failure and the most recent hardware fatal error information.	Provides the same information as no option. Additionally lists fan status, temperatures, ASIC, and PROM revisions.

The following example shows output for the `prtdiag` command in verbose mode.

```
# prtdiag -v
System Configuration:  Sun Microsystems  sun4u Sun SPARC Enterprise M5000 Server
System clock frequency: 1012 MHz
Memory size: 8064 Megabytes

================================== CPUs ==================================

       CPU              CPU            Run       L2$       CPU       CPU
LSB    Chip              ID            MHz        MB       Impl.     Mask
---    ----      --------------------  ----       ---       -----     ----
 00      0          0,   1,   2,   3   2150      4.0          6       129
 00      1          8,   9,  10,  11   2150      4.0          6       129

====================== Memory Configuration ======================

       Memory  Available           Memory     DIMM      Number of
LSB    Group   Size                Status     Size      DIMMs
---    ------  ------------------  -------    ------    ---------
 00    A         4096MB            okay       1024MB            8
 00    B         3968MB            okay       1024MB            8

========================= IO Cards =========================

LSB    Name           Model
---    -------------- ------------
 00    scsi           LSI,1064
 00    network        N/A
 00    network        N/A
 00    network        SUNW,pci-ce
 00    fp             N/A
 00    SUNW,qlc       QLE2462
 00    fp             N/A
 00    SUNW,qlc       QLE2462

==================== Hardware Revisions ====================

System PROM revisions:
----------------------

OBP 4.x.build_103***PROTOTYPE BUILD*** 2006/08/01 02:06


================== Environmental Status ==================

Mode switch is in UNLOCK mode
#
```

2.7.3 Using the prtconf Command

Similar to the show-devs command run at the ok prompt, the prtconf command displays the devices that are configured.

The prtconf command identifies hardware that is recognized by the Solaris OS. If hardware is not suspected of being bad yet software applications are having trouble with the hardware, the prtconf command can indicate if the Solaris software recognizes the hardware, and if a driver for the hardware is loaded.

2.7.3.1 Options

TABLE 2-14 describes options for the prtconf command and how those options can help troubleshooting.

TABLE 2-14 Options for prtconf

Option	Description	How It Can Help
No option	Displays the device tree of devices recognized by the OS.	If a hardware device is recognized, then it is probably functioning properly. If the message "(driver not attached)" is displayed for the device or for a sub-device, then the driver for the device is corrupt or missing.
-D	Similar to the output of no option, however the device driver is listed.	Lists the driver needed or used by the OS to enable the device.
-p	Similar to the output of no option, yet is abbreviated.	Reports a brief list of the devices.
-V	Displays the version and date of the OpenBoot PROM firmware.	Provides a quick check of firmware version.

The following example shows output for the prtconf command.

```
# prtconf
System Configuration:  Sun Microsystems  sun4u
Memory size: 8064 Megabytes
System Peripherals (Software Nodes):

SUNW,SPARC-Enterprise
    scsi_vhci, instance #0
    packages (driver not attached)
        SUNW,builtin-drivers (driver not attached)
        deblocker (driver not attached)
```

The `prtconf` output continued.

```
disk-label (driver not attached)
        terminal-emulator (driver not attached)
        obp-tftp (driver not attached)
        ufs-file-system (driver not attached)
    chosen (driver not attached)
    openprom (driver not attached)
        client-services (driver not attached)
    options, instance #0
    aliases (driver not attached)
    memory (driver not attached)
    virtual-memory (driver not attached)
    pseudo-console, instance #0
    nvram (driver not attached)
    pseudo-mc, instance #0
    cmp (driver not attached)
        core (driver not attached)
            cpu (driver not attached)
            cpu (driver not attached)
        core (driver not attached)
            cpu (driver not attached)
            cpu (driver not attached)
    cmp (driver not attached)
        core (driver not attached)
            cpu (driver not attached)
            cpu (driver not attached)
        core (driver not attached)
            cpu (driver not attached)
            cpu (driver not attached)
    pci, instance #0
        ebus, instance #0
            flashprom (driver not attached)
            serial, instance #0
            scfc, instance #0
            panel, instance #0
pci, instance #0
        pci, instance #0
            pci, instance #1
                pci, instance #3
                    scsi, instance #0
                        tape (driver not attached)
                        disk (driver not attached)
                        sd, instance #0 (driver not attached)
                        sd, instance #2
                        sd, instance #4
network, instance #0
                    network, instance #1 (driver not attached)
                pci, instance #4
```

```
                    network, instance #0 (driver not attached)
            pci, instance #2
                SUNW,qlc, instance #0
                    fp (driver not attached)
                        disk (driver not attached)
                    fp, instance #2
                SUNW,qlc, instance #1
                    fp (driver not attached)
                        disk (driver not attached)
                    fp, instance #0
    pci, instance #1
        pci, instance #15
            pci, instance #16
                pci, instance #25
                    pci, instance #31
                    pci, instance #32
                    pci, instance #33
            pci, instance #18
                pci, instance #29
                    pci, instance #34
                    pci, instance #35
                    pci, instance #36
    pci, instance #2
        pci, instance #5
            pci, instance #6
                pci, instance #7
                pci, instance #8
            pci, instance #9
                pci, instance #10
                pci, instance #11
            pci, instance #12
                pci, instance #13
                pci, instance #14
    pci, instance #3
    os-io (driver not attached)
    iscsi, instance #0
    pseudo, instance #0
#
```

2.7.4 Using the `netstat` Command

The `netstat` command displays the network status.

2.7.4.1 Options

TABLE 2-15 describes options for the `netstat` command and how those options can help troubleshooting.

TABLE 2-15 Options for `netstat`

Option	Description	How It Can Help
`-i`	Displays the interface state, including packets in/out, error in/out, collisions, and queue.	Provides a quick overview of the network status.
`-i` *interval*	Providing a trailing number with the `-i` option repeats the `netstat` command every *interval* seconds.	Identifies intermittent or long duration network events. By piping `netstat` output to a file, overnight activity can be viewed all at once.
`-p`	Displays the media table.	Provides MAC address for hosts on the subnet.
`-r`	Displays the routing table.	Provides routing information.
`-n`	Replaces host names with IP addresses.	Used when an address is more useful than a host name.

The following example shows output for the `netstat -p` command.

```
# netstat -p
Net to Media Table: IPv4
Device   IP Address               Mask      Flags      Phys Addr
------ -------------------- --------------- -------- ---------------
bge0   san-ff1-14-a         255.255.255.255 o        00:14:4f:3a:93:61
bge0   san-ff2-40-a         255.255.255.255 o        00:14:4f:3a:93:85
sppp0  224.0.0.22           255.255.255.255
bge0   san-ff2-42-a         255.255.255.255 o        00:14:4f:3a:93:af
bge0   san09-lab-r01-66     255.255.255.255 o        00:e0:52:ec:1a:00
sppp0  192.168.1.1          255.255.255.255
bge0   san-ff2-9-b          255.255.255.255 o        00:03:ba:dc:af:2a
bge0   bizzaro              255.255.255.255 o        00:03:ba:11:b3:c1
bge0   san-ff2-9-a          255.255.255.255 o        00:03:ba:dc:af:29
bge0   racerx-b             255.255.255.255 o        00:0b:5d:dc:08:b0
bge0   224.0.0.0            240.0.0.0       SM       01:00:5e:00:00:00
#
```

2.7.5 Using the ping Command

The ping command sends ICMP ECHO_REQUEST packets to network hosts. Depending on how the ping command is configured, the output displayed can identify troublesome network links or nodes. The destination host is specified in the variable *hostname*.

2.7.5.1 Options

TABLE 2-16 describes options for the ping command and how those options can help troubleshooting.

TABLE 2-16 Options for ping

Option	Description	How It Can Help
hostname	The probe packet is sent to *hostname* and returned.	Verifies that a host is active on the network.
-g *hostname*	Forces the probe packet to route through a specified gateway.	By identifying different routes to the target host, those individual routes can be tested for quality.
-i *interface*	Designates which interface to send and receive the probe packet through.	Enables a simple check of secondary network interfaces.
-n	Replaces host names with IP addresses.	Used when an address is more beneficial than a host name.
-s	Pings continuously in one-second intervals. Ctrl-C aborts. Upon abort, statistics are displayed.	Helps identify intermittent or long-duration network events. By piping ping output to a file, activity overnight can later be viewed at once.
-svR	Displays the route the probe packet followed in one-second intervals.	Indicates probe packet route and number of hops. Comparing multiple routes can identify bottlenecks.

The following example shows output for the ping -s command.

```
# ping -s san-ff2-17-a
PING san-ff2-17-a: 56 data bytes
64 bytes from san-ff2-17-a (10.1.67.31): icmp_seq=0. time=0.427 ms
64 bytes from san-ff2-17-a (10.1.67.31): icmp_seq=1. time=0.194 ms
^C
----san-ff2-17-a PING Statistics----
2 packets transmitted, 2 packets received, 0% packet loss
round-trip (ms)  min/avg/max/stddev = 0.172/0.256/0.427/0.102
#
```

2.7.6 Using the ps Command

The ps command lists the status of processes. Using options and rearranging the command output can assist in determining the resource allocation.

2.7.6.1 Options

TABLE 2-17 describes options for the ps command and how those options can help troubleshooting.

TABLE 2-17 Options for ps

Option	Description	How It Can Help
-e	Displays information for every process.	Identifies the process ID and the executable.
-f	Generates a full listing.	Provides the following process information: user ID, parent process ID, time when executed, and the path to the executable.
-o *option*	Enables configurable output. The pid, pcpu, pmem, and comm options display process ID, percent CPU consumption, percent memory consumption, and the responsible executable, respectively.	Provides only most important information. Knowing the percentage of resource consumption helps identify processes that are affecting performance and might be hung.

The following example shows output for one ps command.

```
# ps
    PID TTY          TIME CMD
101042 pts/3        0:00 ps
101025 pts/3        0:00 sh
#
```

Note – When using sort with the -r option, the column headings are printed so that the value in the first column is equal to zero.

2.7.7 Using the `prstat` Command

The `prstat` utility iteratively examines all active processes and reports statistics based on the selected output mode and sort order. The `prstat` command provides output similar to the `ps` command.

2.7.7.1 Options

TABLE 2-18 describes options for the `prstat` command and how those options can help troubleshooting.

TABLE 2-18 Options for `prstat`

Option	Description	How It Can Help
No option	Displays a sorted list of the top processes that are consuming the most CPU resources. List is limited to the height of the terminal window and the total number of processes. Output is automatically updated every five seconds. Ctrl-C aborts.	Output identifies process ID, user ID, memory used, state, CPU consumption, and command name.
`-n` *number*	Limits output to number of lines.	Limits amount of data displayed and identifies primary resource consumers.
`-s` *key*	Permits sorting list by key parameter.	Useful keys are `cpu` (default), `time`, and `size`.
`-v`	Verbose mode.	Displays additional parameters.

The following example shows output for the `prstat` command.

```
# prstat -n 5 -s size
   PID USERNAME  SIZE   RSS STATE  PRI NICE      TIME  CPU PROCESS/NLWP
100463 root       66M   61M sleep   59    0   0:01:03 0.0% fmd/19
100006 root       11M 9392K sleep   59    0   0:00:09 0.0% svc.configd/16
100004 root       10M 8832K sleep   59    0   0:00:04 0.0% svc.startd/14
100061 root     9440K 6624K sleep   59    0   0:00:01 0.0% snmpd/1
100132 root     8616K 5368K sleep   59    0   0:00:04 0.0% nscd/35
Total: 52 processes, 188 lwps, load averages: 0.00, 0.00, 0.00
#
```

2.8 Other Issues

2.8.1 Can’t Locate Boot Device

When the PCI-X card slot 0 is faulty or it is not seated properly, the firmware will blacklist the entire PCI-X bridge device (and everything attached downstream from it) causing the boot disk to disappear. The problem results in the `showdisk` command failing to display the boot disk and the `bootdisk` command displaying the console message “Can’t locate boot device”.

When this occurs remove the PCI/PCI-X card in slot 0 to see if the boot issue is remedied. If the IO unit is fully stocked and it is not possible to remove the PCI/PCI-X card, then you should attempt to place another card in slot 0, if possible. If this also is not possible you should remove and reinstalling the existing card in slot 0.

CHAPTER 3

Periodic Maintenance

This chapter describes the periodic maintenance required to keep the server running regardless of whether a problem has occurred.

3.1 Tape Drive Unit

It might be necessary to use a cleaning tape when carrying out the cleaning procedure.

Note – Contact your sales representative for tape drive unit options on SPARC Enterprise M4000/M5000 servers.

3.1.1 Cleaning the Tape Drive Unit

To avoid the "Clean Lamp" from prematurely illuminating, the following maintenance rules should be followed:

- Clean your tape drive unit once every 5 to 24 hours of continuous use, or once a week.
- Clean your tape drive unit once a month, even if it is not in use.
- Clean your tape drive unit whenever the "Clean Lamp" indicator is lit or blinking.
- Clean your tape drive unit before inserting a new data cassette.
- Replace the cleaning cassette when the tape inside of the cassette has completely wound up onto the right-hand spool or when the three lamps are in the following states:"Off","Lit" and "Blinking."

- Remove the cassette before turning the power "OFF". The tape life might be shortened or a malfunction might occur during the backup process if the power is turned "OFF" while the cassette is still inside.

Note – If the "cleaning lamp" starts blinking immediately after completion of a cleaning operation, the data cassette might have been damaged. In this case, replace the data cassette.

CHAPTER 4

FRU Replacement Preparation

This chapter describes how to prepare a field-replaceable unit (FRU) for safe replacement. The information is organized into the following topics:

- "FRU Replacement Method" on page 4-1
- "Active Replacement" on page 4-4
- "Hot Replacement" on page 4-6
- "Cold Replacement (Powering the Server Off and On)" on page 4-12

4.1 FRU Replacement Method

There are three basic methods for replacing the FRUs:

Active replacement – To replace a FRU while the domain, to which the FRU belongs, continues running. Active replacement requires that the FRU be inactivated or powered down using either an XSCF command or Solaris OS command. Because the power supply unit (PSU) and fan unit (FAN) do not belong to any domain, they are operated by using XSCF commands, regardless of the operating state of the Solaris OS.

Note – The procedure for isolating the hard disk drive from the Solaris OS varies depending on whether disk mirroring software or other support software is used. For details, see the relevant software manuals.

Hot replacement –To replace a FRU while the domains are powered off. Depending on the FRU to be replaced, the FRU can either be directly replaced or be inactivated or powered down using an XSCF command.

Cold replacement – To replace a FRU while all domains are stopped and the server is powered off and unplugged.

TABLE 4-1 lists the FRUs, location and access, and the replacement method.

TABLE 4-1 FRU Replacement Information

FRU	FRU Location/Access	Removal Method(s)
PCI cassette (PCIe)	Rear	Active replacement (`cfgadm`) Hot replacement Cold replacement
Hard disk drive (HDD)	Front	Active replacement (`cfgadm`) Hot replacement Cold replacement
Power supply unit (PSU)	Front	Active replacement* (`replacefru`) Hot replacement (`replacefru`) Cold replacement
172-mm fans (FAN_A)	Top	Active replacement\ (`replacefru`) Hot replacement(`replacefru`) Cold replacement
60-mm fans (FAN_B)	Top	Active replacement (`replacefru`) Hot replacement (`replacefru`) Cold replacement
Tape drive unit (TAPEU)	Front	Active replacement Hot replacement Cold replacement
I/O unit (IOU)	Rear	Cold replacement
I/O unit DC-DC Converter	Rear	Cold replacement
I/O unit DDC Riser (DDCR)	Rear	Cold replacement
CD-RW/DVD-RW Drive Unit (DVDU)	Front	Hot replacement Cold replacement
Backplane unit (BPU_A, BPU_B)	Top	Cold replacement

TABLE 4-1 FRU Replacement Information *(Continued)*

FRU	FRU Location/Access	Removal Method(s)
CPU module (CPUM_A)	Top	Cold replacement
Memory board (MEMB)	Top	Cold replacement
Motherboard (SPARC Enterprise M4000) (MBU_A)	Rear	Cold replacement
Motherboard DC-DC Converter (SPARC Enterprise M4000) (DDC_A, DDC_B)	Rear	Cold replacement
Motherboard (SPARC Enterprise M5000) (MBU_B)	Top	Cold replacement
Motherboard DC-DC Converter (SPARC Enterprise M5000) (DDC_A, DDC_B)	Top	Cold replacement
eXtended System Control facility unit (XSCFU)	Rear	Cold replacement
Hard disk drive backplane (HDDBP)	Top	Cold replacement
CD-RW/DVD-RW backplane	Top	Cold replacement
Tape drive backplane (TAPEBP)	Top	Cold replacement
Operator panel (OPNL)	Top	Cold replacement

* When using active replacement for a PSU, only one power supply unit should be replaced at a time to ensure redundancy.

\ When using active replacement for a 172-mm or 60-mm fan unit, only one fan unit should be replaced at a time to ensure redundancy.

4.2 Active Replacement

In active replacement the Solaris OS must be configured to allow the component to be replaced. Active replacement has four stages:

- "Removing a FRU From a Domain" on page 4-4
- "Removing and Replacing a FRU" on page 4-5
- "Adding a FRU Into a Domain" on page 4-5
- "Verifying Hardware Operation" on page 4-6

Note – If the hard disk drive is the boot device, the hard disk will have to be replaced using cold replacement procedures. However, active replacement can be used if the boot disk can be isolated from the Solaris OS by disk mirroring software and other software.

4.2.1 Removing a FRU From a Domain

Note – Before you remove a PCI cassette, make sure that there is no I/O activity on the card in the cassette.

---

1. **From the Solaris prompt, type the `cfgadm` command to get the component status.**

```
# cfgadm -a
Ap_Id                          Type         Receptacle   Occupant
Condition
iou#0-pci#0                 etherne/hp   connected    configured   ok
iou#0-pci#1                  fibre/hp    connected    configured   ok
iou#0-pci#2                 pci-pci/hp   connected    configured   ok
```

Ap_Id includes the IOU number (iou#0 or iou#1) and the PCI cassette slot number (pci#1, pci#2, pci#3, pci#4).

2. **Type the `cfgadm` command to disconnect the component from the domain:**

```
# cfgadm -c unconfigure Ap_Id
```

Note – For a PCI cassette, type the `cfgadm -c disconnect` command to disconnect the component from the domain.

The Ap_Id is shown in the output of `cfgadm`. `iou#0-pci#0` for example.

3. **Type the `cfgadm` command to confirm the component is now disconnected.**

```
# cfgadm -a
Ap_Id                          Type         Receptacle   Occupant
Condition
iou#0-pci#0                  etherne/hp   disconnected unconfigured
unknown
iou#0-pci#1                  fibre/hp     connected    configured   ok
iou#0-pci#2                  pci-pci/hp   connected    configured   ok
```

4.2.2 Removing and Replacing a FRU

Once the FRU has been removed from the domain, see "Removing and Replacing a FRU" on page 4-7

4.2.3 Adding a FRU Into a Domain

1. **From the Solaris prompt, type the `cfgadm` command to connect the component to the domain.**

```
# cfgadm -c configure Ap_Id
```

The Ap_Id is shown in the output of `cfgadm`. `iou#0-pci#0` for example.

2. **Type the `cfgadm` command to confirm the component is now connected.**

```
# cfgadm -a
Ap_Id                          Type         Receptacle   Occupant
Condition
iou#0-pci#0                  etherne/hp   connected    configured   ok
iou#0-pci#1                  fibre/hp     connected    configured   ok
iou#0-pci#2                  pci-pci/hp   connected    configured   ok
```

4.2.4 Verifying Hardware Operation

- **Verify the state of the status LEDs.**

The POWER LED should be On and the CHECK LED should not be On.

Note – Note - If the hard disk drive is the boot device, the hard disk will have to be replaced using cold replacement procedures. However, active replacement can be used if the boot disk can be isolated from the Solaris OS by disk mirroring software and other software.

4.3 Hot Replacement

In hot replacement the Solaris OS does not need to be configured to allow the component to be replaced. Depending on the FRU to be replaced, the FRU can either be directly replaced or be inactivated or powered down using an XSCF command.

4.3.1 Removing and Replacing a FRU

1. From the XSCF Shell prompt, type the `replacefru` command.

CODE EXAMPLE 4-1 `replacefru` command

```
XSCF> replacefru
------------------------------------------------------------------
Maintenance/Replacement Menu
Please select a type of FRU to be replaced.

1. FAN        (Fan Unit)
2. PSU        (Power Supply Unit)
------------------------------------------------------------------

Select [1,2|c:cancel] :1

------------------------------------------------------------------
Maintenance/Replacement Menu
Please select a FAN to be replaced.

No. FRU Status
--- --------------- ------------------
 1. FAN_A#0         Faulted
 2. FAN_A#1         Normal
 3. FAN_A#2         Normal
 4. FAN_A#3         Normal
------------------------------------------------------------------
Select [1-4|b:back] :1

You are about to replace FAN_A#0.
Do you want to continue?[r:replace|c:cancel] :r

Please confirm the CHECK LED is blinking.
If this is the case, please replace FAN_A#0.
After replacement has been completed, please select[f:finish] :f
```

The `replacefru` command automatically tests the status of the component after the remove and replace is finished.

CODE EXAMPLE 4-2 `replacefru` command status

```
Diagnostic tests of FAN_A#0 is started.
[This operation may take up to 2 minute(s)]
(progress scale reported in seconds)
   0.....  30.....  60.....  90.....done

------------------------------------------------------------------
Maintenance/Replacement Menu
Status of the replaced unit.

FRU Status
------------ --------
FAN_A#0       Normal
------------------------------------------------------------------
The replacement of FAN_A#0 has completed, normally.[f:finish] :f

------------------------------------------------------------------
Maintenance/Replacement Menu
Please select a type of FRU to be replaced.

1. FAN        (Fan Unit)
2. PSU        (Power Supply Unit)
------------------------------------------------------------------
Select [1,2|c:cancel] : C
XSCF>
```

Note – The display may vary depending on the XCP version.

When the tests are complete the program returns to the original menu. Select cancel to return to the XSCF Shell prompt.

Refer to the `replacefru` man page for more information.

4.3.2 Verifying Hardware Operation

1. Type the `showhardconf` **command to confirm the new component is installed.**

CODE EXAMPLE 4-3 showhardconf

```
XSCF> showhardconf
SPARC Enterprise M5000;
    + Serial:BCF07500B6; Operator_Panel_Switch:Locked;
    + Power_Supply_System:Dual; SCF-ID:XSCF#0;
    + System_Power:On; System_Phase:Cabinet Power On;
    Domain#0 Domain_Status:Initialization Phase;
    Domain#1 Domain_Status:Initialization Phase;

 MBU_B Status:Normal; Ver:0201h; Serial:BC07490823  ;
       + FRU-Part-Number:CF00541-0478 05   /541-0478-05         ;
        + Memory_Size:64 GB;
      CPUM#0-CHIP#0 Status:Normal; Ver:0501h; Serial:PP0723016Q  ;
         + FRU-Part-Number:CA06761-D204 A0   /LGA-JUPP-01        ;
           + Freq:2.530 GHz; Type:32;
           + Core:4; Strand:2;
                 :
      CPUM#3-CHIP#1 Status:Normal; Ver:0501h; Serial:PP074804E9  ;
         + FRU-Part-Number:CA06761-D204 A0   /LGA-JUPP-01        ;
           + Freq:2.530 GHz; Type:32;
           + Core:4; Strand:2;
        MEMB#0 Status:Normal; Ver:0101h; Serial:BF09061G0E  ;
         + FRU-Part-Number:CF00541-0545 06   /541-0545-06        ;
           MEM#0A Status:Normal;
         + Code:c10000000000000005372T128000HR3.7A  356d-0d016912;
                + Type:1A; Size:1 GB;
                 :
           MEM#3B Status:Normal;
         + Code:c10000000000000004572T128000HR3.7A  252b-04123424;
                + Type:1A; Size:1 GB;
                 :
 MEMB#7 Status:Normal; Ver:0101h; Serial:BF09061GBA  ;
          + FRU-Part-Number:CF00541-0545 06   /541-0545-06        ;
            MEM#0A Status:Normal;
        + Code:2cffffffffffffff0818HTF12872Y-53EB3 0300-d504600c;
                + Type:1A; Size:1 GB;
                 :
            MEM#3B Status:Normal;
        + Code:7f7ffe00000000004aEBE10RD4AGFA-5C-E 3020-2229c19c;
                + Type:1A; Size:1 GB;
```

This sample shows the showhardconf output continued.

CODE EXAMPLE 4-4 showhardconf

```
DDC_A#0 Status:Normal;
        DDC_A#1 Status:Normal;
        DDC_A#2 Status:Normal;
        DDC_A#3 Status:Normal;
        DDC_B#0 Status:Normal;
        DDC_B#1 Status:Normal;
        IOU#0 Status:Normal; Ver:0101h; Serial:BF07486TEU  ;
          + FRU-Part-Number:CF00541-2240 02  /541-2240-02        ;
            DDC_A#0 Status:Normal;
            DDCR Status:Normal;
                DDC_B#0 Status:Normal;
        IOU#1 Status:Normal; Ver:0101h; Serial:BF073226HP  ;
          + FRU-Part-Number:CF00541-2803 01  /541-2803-01        ;
            DDC_A#0 Status:Normal;
            DDCR Status:Normal;
                DDC_B#0 Status:Normal;
       XSCFU Status:Normal,Active; Ver:0101h; Serial:BF07435D98  ;
          + FRU-Part-Number:CF00541-0481 04  /541-0481-04        ;
        OPNL Status:Normal; Ver:0101h; Serial:BF0747690D  ;
          + FRU-Part-Number:CF00541-0850 06  /541-0850-06        ;
        PSU#0 Status:Normal; Serial:0017527-0738063762;
            + FRU-Part-Number:CF00300-1898 0350 /300-1898-03-50;
            + Power_Status:Off; AC:200 V;
        PSU#3 Status:Normal; Serial:0017527-0738063767;
            + FRU-Part-Number:CF00300-1898 0350 /300-1898-03-50;
            + Power_Status:Input fail; AC: - ;
        FANBP_C Status:Normal; Ver:0501h; Serial:FF2#24      ;
          + FRU-Part-Number:CF00541-3099 01  /541-3099-01        ;
            FAN_A#0 Status:Normal;
            FAN_A#1 Status:Normal;
            FAN_A#2 Status:Normal;
            FAN_A#3 Status:Normal;
```

Refer to the showhardconf man page for more information.

2. **Type the `showhardconf -u` command to display the number of FRUs in each unit.**

CODE EXAMPLE 4-5 `showhardconf -u`

```
XSCF> showhardconf -u
SPARC Enterprise M5000; Memory_Size:64 GB;
    +----------------------------------+------------+
    |              FRU                 |  Quantity  |
    +----------------------------------+------------+
    | MBU_B                            |        1   |
    |     CPUM                         |        4   |
    |         Freq:2.530 GHz;          |   (    8)  |
    |     MEMB                         |        8   |
    |         MEM                      |       64   |
    |             Type:1A; Size:1 GB;  |   (   64)  |
    |     DDC_A                        |        4   |
    |     DDC_B                        |        2   |
    | IOU                              |        2   |
    |     DDC_A                        |        2   |
    |     DDCR                         |        2   |
    |         DDC_B                    |        2   |
    | XSCFU                            |        1   |
    | OPNL                             |        1   |
    | PSU                              |        4   |
    | FANBP_C                          |        1   |
    |     FAN_A                        |        4   |
    +----------------------------------+------------+
```

Refer to the `showhardconf -u` man page for more information.

3. **Verify the state of the status LEDs on the FRU.**

   Refer to TABLE 2-11 for LED status.

4.4 Cold Replacement (Powering the Server Off and On)

In cold replacement all business operations are stopped. Cold replacement is the act of powering off the server and disconnecting input power. This is normally required for safety when the inside of the server is accessed.

Note – The input power cables are used to ground the server. If the server is not mounted in a rack use a grounding strap to ground the server.

Note – After a complete chassis power cycle (all power cords removed), make certain to allow 30 seconds before plugging the power cords back into the chassis.

4.4.1 Powering the Server Off Using Software

1. **Notify users that the server is being powered off.**
2. **Back up the system files and data to tape, if necessary.**
3. **Log in to the XSCF Shell and type the** `poweroff` **command.**

```
XSCF> poweroff -a
```

The following actions occur when the `poweroff` command is used:

- The Solaris OS shuts down cleanly.
- The server powers off to Standby mode (the XSCF unit and one fan will still have power).

Refer to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for details.

4. **Verify the state of the status LED on the XSCF.**

   The POWER LED should be off.

5. **Disconnect all power cables from the input power source.**

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

4.4.2 Powering the Server On Using Software

1. **Make sure that the server has enough power supply units to run the desired configuration.**
2. **Connect all power cables to the input power source.**
3. **Make sure the XSCF STANDBY LED on the operator panel is On.**
4. **Turn the keyswitch on the operator panel to the desired mode position (Locked or Service).**
5. **Log into the XSCF Shell and type the** `poweron` **command.**

```
XSCF> poweron -a
```

Refer to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for details.

6. **After a delay the following activities occur:**

- The operator panel POWER LED lights.
- The system executes the power-on self-test (POST).

Then, the server is completely powered on.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

4.4.3 Powering the Server Off Manually

1. **Notify users that the server is being powered off.**
2. **Back up the system files and data to tape, if necessary.**
3. **Place the keyswitch in the Service position.**
4. **Press and hold the Power switch on the operator panel for four seconds or longer to initiate the power off.**
5. **Verify the state of the status POWER LED on the operator panel is off.**
6. **Disconnect all power cables from the input power source.**

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

4.4.4 Powering the Server On Manually

1. **Make sure that the server has enough power supply units to run the desired configuration.**
2. **Connect all power cables to the input power source.**
3. **Make sure the XSCF STANDBY LED is On.**
4. **Turn the keyswitch on the operator panel to the desired mode position (Locked or Service).**
5. **Press the Power switch on the operator panel.**

   After a delay the following activities occur:

- The operator panel POWER LED lights.
- The system executes the power-on self-test (POST).

Then, the server is completely powered on.

Note – If the Solaris automatic booting is set, using the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

4.4.5 Verifying Hardware Operation

1. **From the** `ok` **prompt, press the Enter key, and press the "#." (number sign and period) keys to switch you from the domain console to the XSCF console.**

2. **Type the** `showhardconf` **command to confirm the new component is installed.**

CODE EXAMPLE 4-6 `showhardconf`

```
XSCF> showhardconf
SPARC Enterprise 5000;
    + Serial:BE80601000; Operator_Panel_Switch:Service;
    + Power_Supply_System:Single; SCF-ID:XSCF#0;
    + System_Power:On;
    Domain#0 Domain_Status:Powered Off;

    MBU_B Status:Normal; Ver:0101h; Serial:78670002978:            ;
        + FRU-Part-Number:CF00541-0478 01 /541-0478-01 ;
        + Memory_Size:64 GB;
        CPUM#0-CHIP#0 Status:Normal; Ver:0201h; Serial:PP0629L068 ;
            + FRU-Part-Number:CF00375-3477 50 /375-3477-50 ;
            + Freq:2.150 GHz; Type:16;
            + Core:2; Strand:2;
        CPUM#0-CHIP#1 Status:Normal; Ver:0201h; Serial:PP0629L068 ;
            + FRU-Part-Number:CF00375-3477 50 /375-3477-500 ;
            + Freq:2.150 GHz; Type:16;
            + Core:2; Strand:2;
        MEMB#0 Status:Normal; Ver:0101h; Serial:01068:            ;
            + FRU-Part-Number:CF00541-0545 01 /541-0545-01 ;
            MEM#0A Status:Normal;
                + Code:c100000000000000004572T128000HR3.7A 252b-04123520;
                + Type:1B; Size:1 GB;
            MEM#0B Status:Normal;
                + Code:c100000000000000004572T128000HR3.7A 252b-04123e25;
                + Type:1B; Size:1 GB;
            MEM#1A Status:Normal;
                + Code:c100000000000000004572T128000HR3.7A 252b-04123722;
                + Type:1B; Size:1 GB;
            MEM#1B Status:Normal;
                + Code:c100000000000000004572T128000HR3.7A 252b-04123b25;
                + Type:1B; Size:1 GB;
            MEM#2A Status:Normal;
                + Code:c100000000000000004572T128000HR3.7A 252b-04123e20;
                + Type:1B; Size:1 GB;
            MEM#2B Status:Normal;
                + Code:c100000000000000004572T128000HR3.7A 252b-04123822;
                + Type:1B; Size:1 GB;
```

This sample shows the showhardconf output continued.

CODE EXAMPLE 4-7 showhardconf

```
DDC_A#0 Status:Normal;
        DDC_A#1 Status:Normal;
        DDC_A#2 Status:Normal;
        DDC_A#3 Status:Normal;
        DDC_B#0 Status:Normal;
        DDC_B#1 Status:Normal;
    IOU#0 Status:Normal; Ver:0101h; Serial:7867000395 ;
        + FRU-Part-Number:CF00541-0493 01 /541-0493-01 ;
        DDC_A#0 Status:Normal;
        DDCR Status:Normal;
        DDC_B#0 Status:Normal;
    XSCFU Status:Normal,Active; Ver:0101h; Serial:78670002628 ;
        + FRU-Part-Number:CF00541-0481 01 /541-0481-01 ;
    OPNL Status:Normal; Ver:0101h; Serial:78670000878 ;
        + FRU-Part-Number:CF00541-0850 01 /541-0850-01 ;
    PSU#0 Status:Normal; Serial:XF0345;3
        + FRU-Part-Number:CF00300-1898 50 /300-1898-50;
        + Power_Status:Off; AC:200 V;
    PSU#1 Status:Normal; Serial:XF0346;
        + FRU-Part-Number:CF00300-1898 50 /300-1898-50;
        + Power_Status:Off; AC:200 V;
    PSU#2 Status:Normal; Serial:XF03470;
        + FRU-Part-Number:CF00300-1898 50 /300-1898-50;
        + Power_Status:Off; AC:200 V;
    PSU#3 Status:Normal; Serial:XF0348;
        + FRU-Part-Number:CF00300-1898 50 /300-1898-50;
        + Power_Status:Off; AC:200 V;
    FANBP_C Status:Normal; Ver:0101h; Serial:7867000053 ;
        + FRU-Part-Number:CF00541-0848 01 /541-0848-01 ;
        FAN_A#0 Status:Normal;
        FAN_A#1 Status:Normal;
        FAN_A#2 Status:Normal;
        FAN_A#3 Status:Normal;
XSCF>
```

Refer to the showhardconf man page for more information.

3. **Type the** console **command to** switch from the XSCF console to the ok prompt (domain console) again**:**

```
XSCF> console -d 0
```

4. **From the** `ok` **prompt, type the** `show-devs` **command** to ensure all PCI cards are mounted**:**

CODE EXAMPLE 4-8 `show-devs`

```
ok show-devs
/pci@41,700000
/pci@40,600000
/pci@48,4000
/cmp@480,0
/pseudo-mc@240,200
/nvram
/pseudo-console
/virtual-memory
/memory@m0
/aliases
/options
/openprom
/chosen
/packages
/pci@40,600000/pci@0
/pci@40,600000/pci@0/pci@9
/pci@40,600000/pci@0/pci@8
/pci@40,600000/pci@0/pci@8/pci@0,1
/pci@40,600000/pci@0/pci@8/pci@0
/pci@40,600000/pci@0/pci@8/pci@0,1/ethernet@1
/pci@40,600000/pci@0/pci@8/pci@0/network@2,1
/pci@40,600000/pci@0/pci@8/pci@0/network@2
/pci@40,600000/pci@0/pci@8/pci@0/scsi@1
/pci@40,600000/pci@0/pci@8/pci@0/scsi@1/disk
/pci@40,600000/pci@0/pci@8/pci@0/scsi@1/tape
/pci@48,4000/ebus@1
/pci@48,4000/ebus@1/panel@14,280030
/pci@48,4000/ebus@1/scfc@14,200000
/pci@48,4000/ebus@1/serial@14,400000
/pci@48,4000/ebus@1/flashprom@10,0
/cmp@480,0/core@1
/cmp@480,0/core@0
/cmp@480,0/core@1/cpu@1
/cmp@480,0/core@1/cpu@0
/cmp@480,0/core@0/cpu@1
/cmp@480,0/core@0/cpu@0
/openprom/client-services
/packages/obp-tftp
/packages/terminal-emulator
/packages/disk-label
/packages/deblocker
/packages/SUNW,builtin-drivers
ok
```

5. **Type the** `probe-scsi-all` **command to confirm that the storage devices are mounted.**

CODE EXAMPLE 4-9 `probe-scsi-all`

```
ok probe-scsi-all
/pci@0,600000/pci@0/pci@8/pci@0/scsi@1

MPT Version 1.05, Firmware Version 1.07.00.00

Target 0
Unit 0   Disk    SEAGATE ST973401LSUN72G 0556   143374738 Blocks,
73 GB
  SASAddress 5000c5000092beb9  PhyNum 0
Target 1
Unit 0   Disk    SEAGATE ST973401LSUN72G 0556   143374738 Blocks,
73 GB
  SASAddress 5000c500002eeaf9  PhyNum 1
Target 3
Unit 0   Removable Read Only device    TSSTcorpCD/DVDW TS-L532USR01
  SATA device  PhyNum 3
ok
```

6. **Type the** `boot` **command to start the operating system.**

```
ok boot
```

CHAPTER 5

Internal Components Access

This chapter describes how to access the internal components. The information is organized into the following topics:

- "Sliding the Server In and Out to the Fan Stop" on page 5-1
- "Top Cover Remove and Replace" on page 5-5
- "Fan Cover Remove and Replace" on page 5-8

5.1 Sliding the Server In and Out to the Fan Stop

The slide rails have two designated lock points. The first, the fan stop, is for easy access to the fan units. The fan units are hot, active, or cold replacement components. When using active replacement, only one fan unit should be replaced at a time to ensure redundancy.

5.1.1 Sliding the Server Out of the Equipment Rack

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

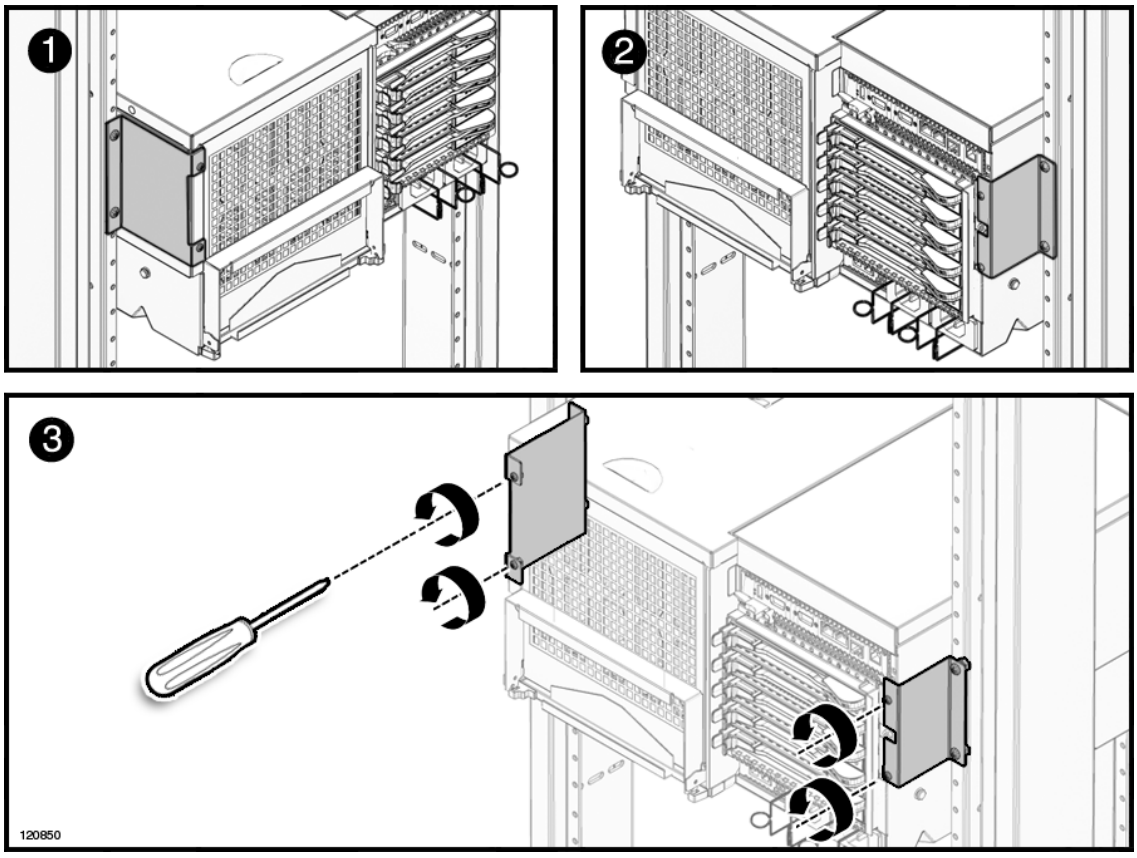
Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Deploy the rack's antitilt features (if applicable).**

   Refer to the manual that shipped with the rack for details on antitilt features.

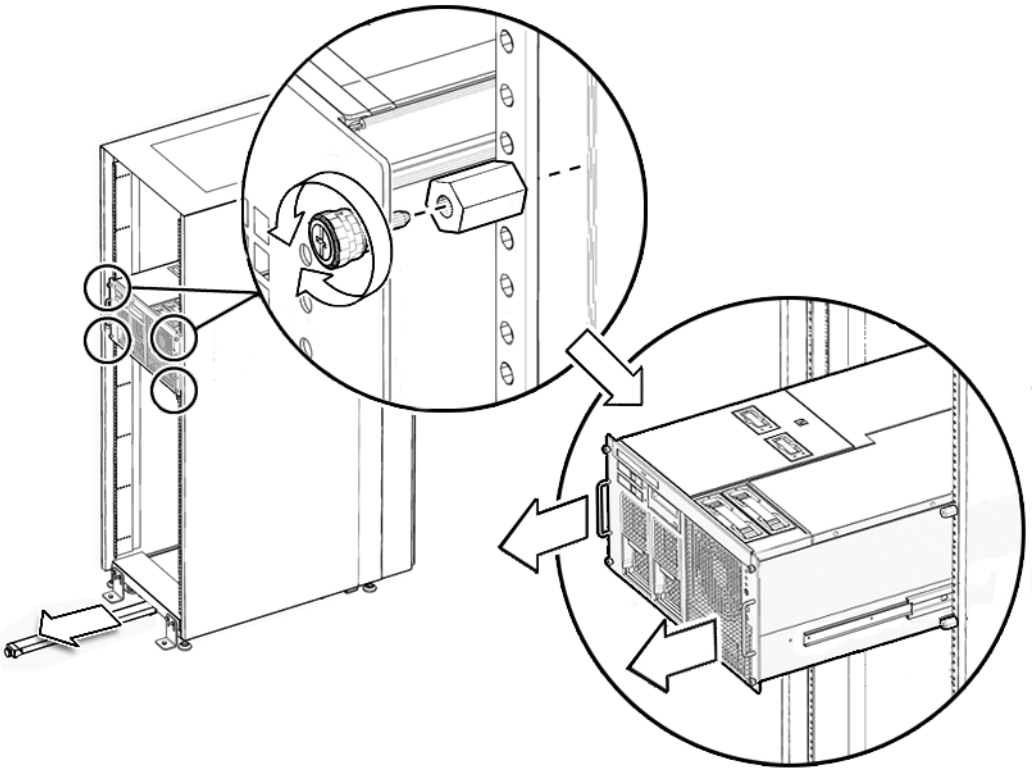
2. **If shipping brackets are attached to the back of the server, loosen the four (4) captive screws (**FIGURE 5-1**).**

FIGURE 5-1 Loosening the Captive Screws on the Shipping Brackets



3. **Loosen the four (4) captive screws at the front of the server (FIGURE 5-2).**

FIGURE 5-2 Loosening the Captive Screws and Pulling Out the Server



4. **Pull the system to the fan stop.**

   The system automatically locks in place at the fan stop.

5.1.2 Sliding the Server Into the Equipment Rack

1. **Push the green plastic releases on each slide rail and push the server back into the equipment rack.**
2. **Tighten the four (4) captive screws at the front of the server to secure it in the rack (FIGURE 5-2).**
3. **Tighten the four (4) captive screws on the shipping brackets at the rear of the server (FIGURE 5-1).**
4. **Restore the rack antitilt features to their original position.**

5.2 Top Cover Remove and Replace

You must slide the server out of the equipment rack before removing the top cover.

5.2.1 Removing the Top Cover

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Deploy the rack's antitilt features (if applicable).**

   Refer to the rack manual for details on the rack's antitilt features.

2. **Loosen the four (4) captive screws at the front of the server (**FIGURE 5-2**).**

3. **Loosen the four (4) captive screws on the shipping brackets at the rear of the system (**FIGURE 5-1**).**

Note – During installation the power cables should have been bundled into a loop with enough slack to allow the system to slide out on the rails. This is called the service loop. If this is not the case the power cables will have to be disconnected to allow the server to pull all the way out of the equipment rack.

4. **Pull the server to the fan stop.**

   The server automatically locks in place at the fan stop.

5. **Push the green plastic releases on each slide rail and pull the server until it is fully extended.**

   The server automatically locks in place when fully extended.

6. **Loosen the captive screw(s) on the center top of the server.**

   The SPARC Enterprise M4000 server has one (1) captive screw (FIGURE 5-1). The SPARC Enterprise M5000 server has two (2) captive screws (FIGURE 5-4).

7. **Slide the top cover towards the rear and then remove it.**

FIGURE 5-3 Removing the SPARC Enterprise M4000 Top Cover

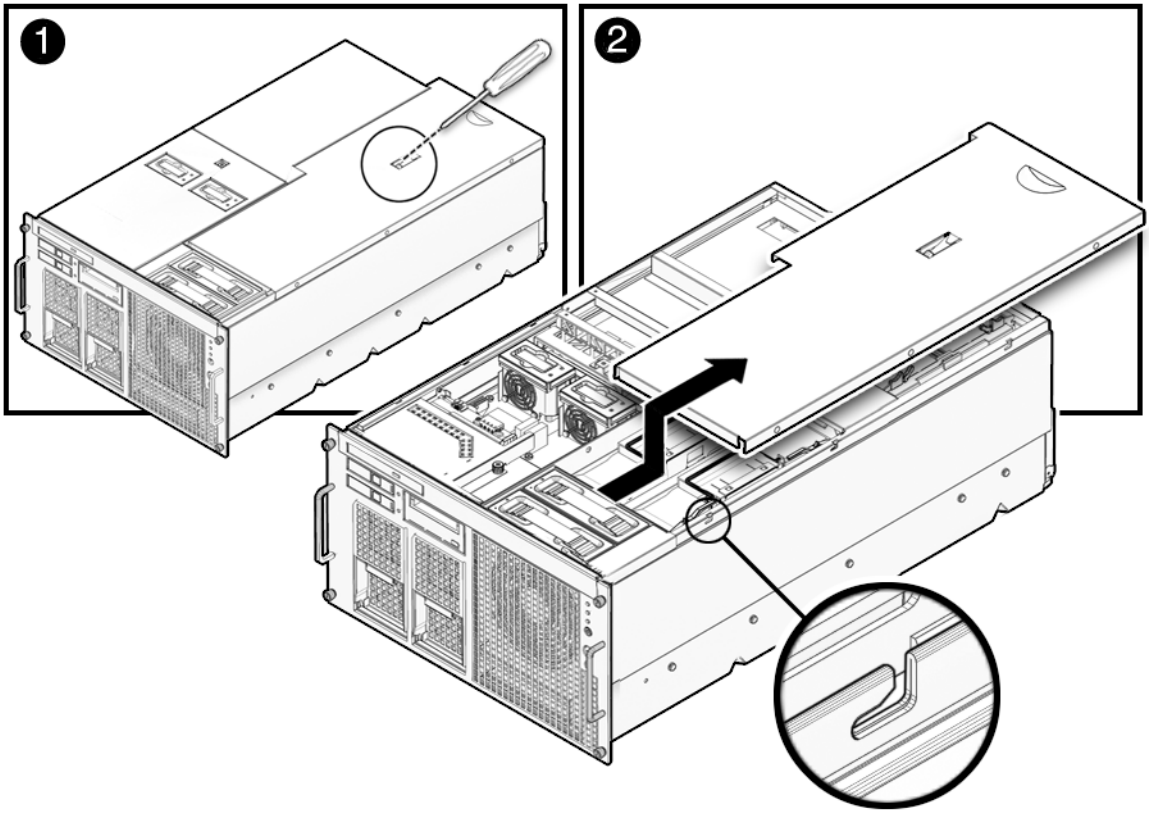
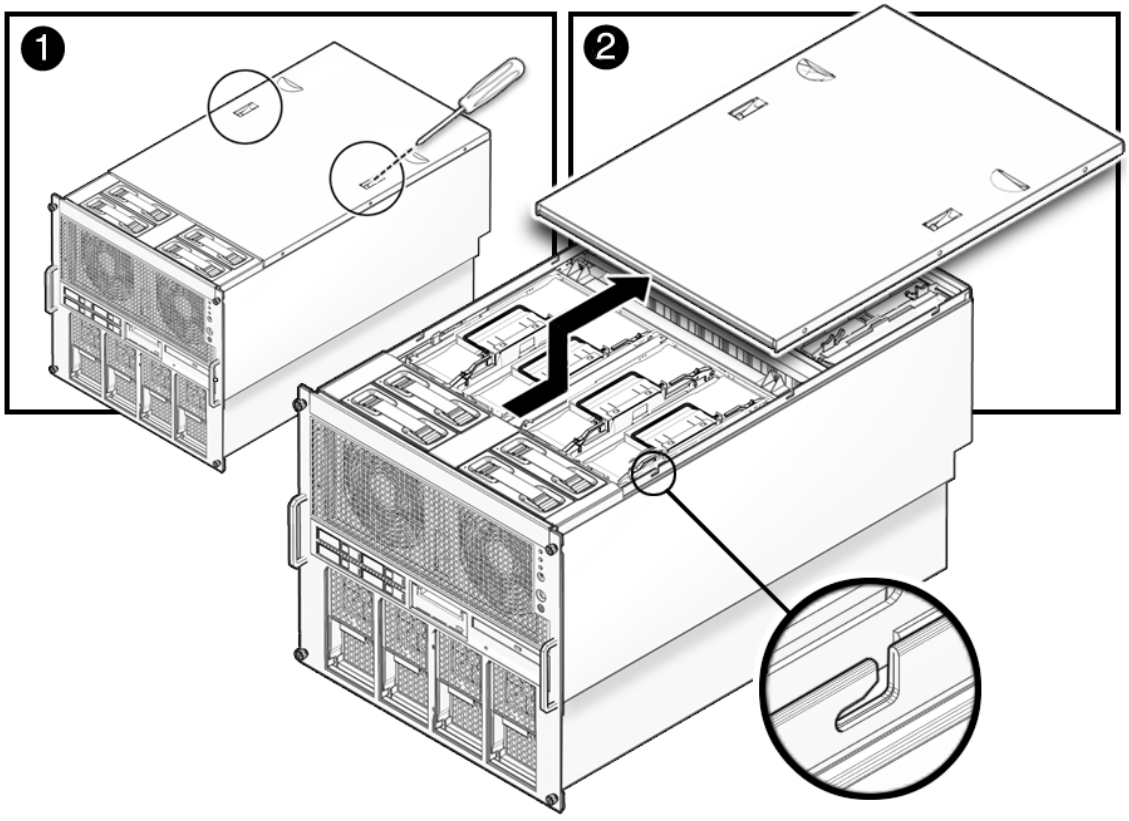


FIGURE 5-4 Removing the SPARC Enterprise M5000 Top Cover



5.2.2 Replacing the Top Cover

1. **Align the top cover and then slide it towards the front of the server.**
2. **Tighten the captive screws at the center top of the server to secure the top cover in place.**
3. **Push the green plastic releases on each slide rail and push the system back into the equipment rack.**
4. **Tighten the four (4) captive screws at the front of the system to secure it in the rack (**FIGURE 5-2**).**
5. **Tighten the four (4) captive screws on the shipping brackets at the rear of the server (**FIGURE 5-1**).**
6. **Reconnect the service loop cables to the rear of the server.**
7. **Restore the rack antitilt features to their original position.**

5.3 Fan Cover Remove and Replace

All internal components are cold replacement components. The server must be powered off and power cables disconnected from the input power source. You must slide the server out of the equipment rack before removing the fan cover.

5.3.1 Removing the Fan Cover

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Deploy the rack's antitilt features (if applicable).**

   Refer to the rack manual for details on the rack's antitilt features.

2. **Loosen the four (4) captive screws at the front of the server (**FIGURE 5-2**).**

3. **Loosen the four (4) captive screws on the shipping brackets at the rear of the system (**FIGURE 5-1**).**

Note – During installation the power cables should have been bundled into a loop with enough slack to allow the system to slide out on the rails. This is called the service loop. If this is not the case the power cables will have to be disconnected to allow the server to pull all the way out of the equipment rack.

4. **Pull the server to the fan stop.**

   The server automatically locks in place at the fan stop.

5. **Push the green plastic releases on each slide rail and pull the server until it is fully extended.**

   The server automatically locks in place when fully extended.

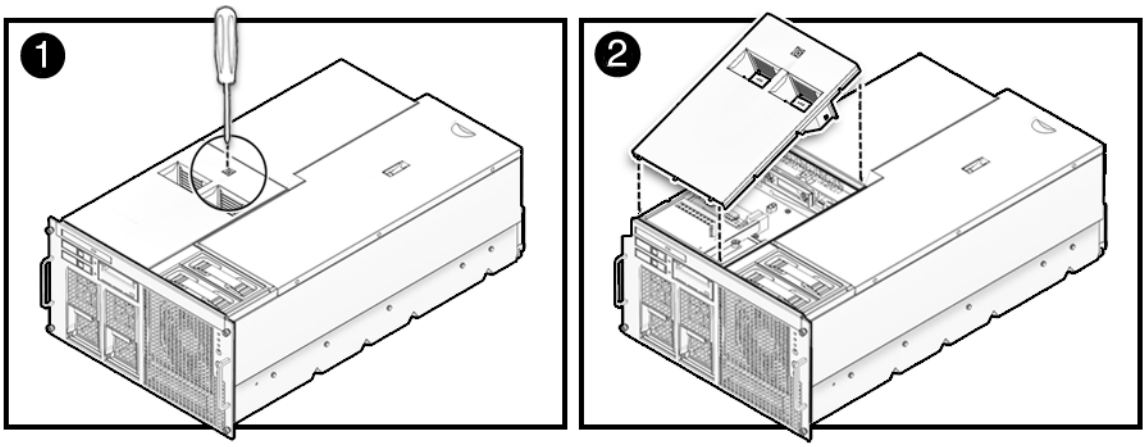
6. **Remove the 60-mm fan units and place them on an ESD mat.**

   See "Removing the 60-mm Fan Module" on page 10-5.

7. **Loosen the captive screw on the fan cover.**

8. **Lift the rear edge of the fan cover and remove it.**

FIGURE 5-5 Removing the Fan Cover



5.3.2 Replacing the Fan Cover

1. **Align the tabs on the forward section of the fan cover and push the cover down to secure it in place.**
2. **Tighten the captive screw on the fan cover.**
3. **Install the 60-mm fan units.**

   See "Installing the 60-mm Fan Module" on page 10-6.
4. **Push the green plastic releases on each slide rail and push the system back into the equipment rack.**
5. **Tighten the four (4) captive screws at the front of the system to secure it in the rack (FIGURE 5-2).**
6. **Tighten the four (4) captive screws on the shipping brackets at the rear of the server (FIGURE 5-1).**
7. **Reconnect the service loop cables to the rear of the server.**
8. **Restore the rack antitilt features to their original position.**

CHAPTER 6

Storage Devices Replacement

This chapter describes how to remove and install the main storage systems. The information is organized into the following topics:

- "Hard Disk Drive Replacement" on page 6-1
- "CD-RW/DVD-RW Drive Unit (DVDU) Replacement" on page 6-12
- "Tape Drive Unit Replacement" on page 6-22

6.1 Hard Disk Drive Replacement

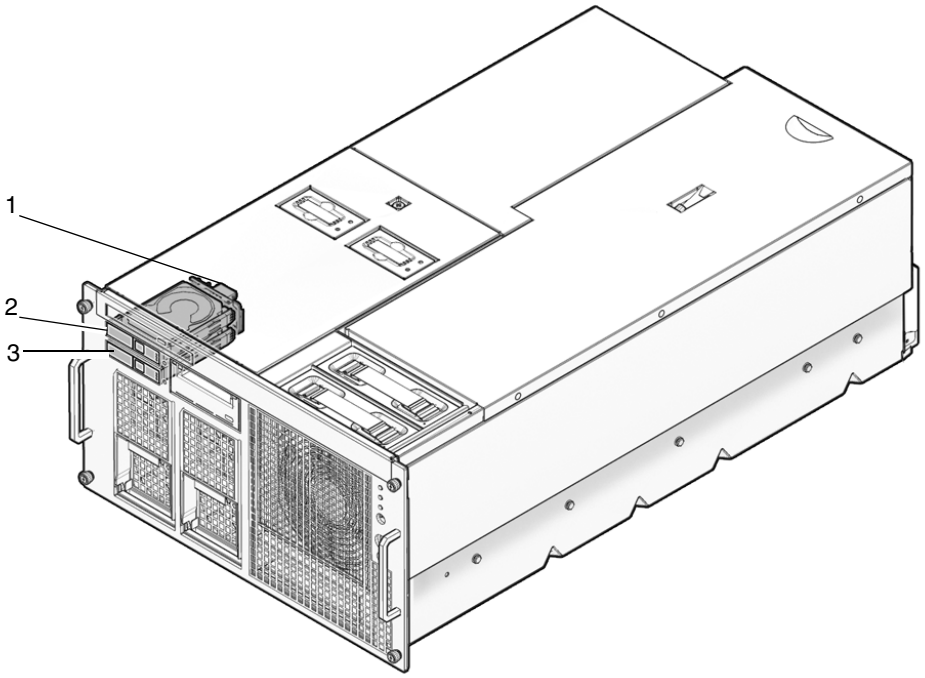
Hard disk drives drives are active, hot, or cold replacement components. Hard disk drive backplanes are cold replacement components. The hard disk drives are identical on both midrange servers. Hard disk drives and hard disk drive backplane information is organized into the following sections:

- "Accessing the Hard Disk Drive" on page 6-4
- "Removing the Hard Disk Drive" on page 6-4
- "Installing the Hard Disk Drive" on page 6-5
- "Securing the Server" on page 6-5
- "Accessing the Hard Disk Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-6
- "Removing the Hard Disk Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-6
- "Installing the Hard Disk Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-7
- "Securing the Server" on page 6-8
- "Accessing the Hard Disk Drive Backplane of the SPARC Enterprise M5000 Server" on page 6-9

- "Removing the Hard Disk Drive Backplane of the SPARC Enterprise M5000 Server" on page 6-10
- "Installing the Hard Disk Drive Backplane of the SPARC Enterprise M5000 Server" on page 6-10
- "Securing the Server" on page 6-11

The following illustration shows the locations of the hard disk drives and the hard disk backplane on the SPARC Enterprise M4000 server.

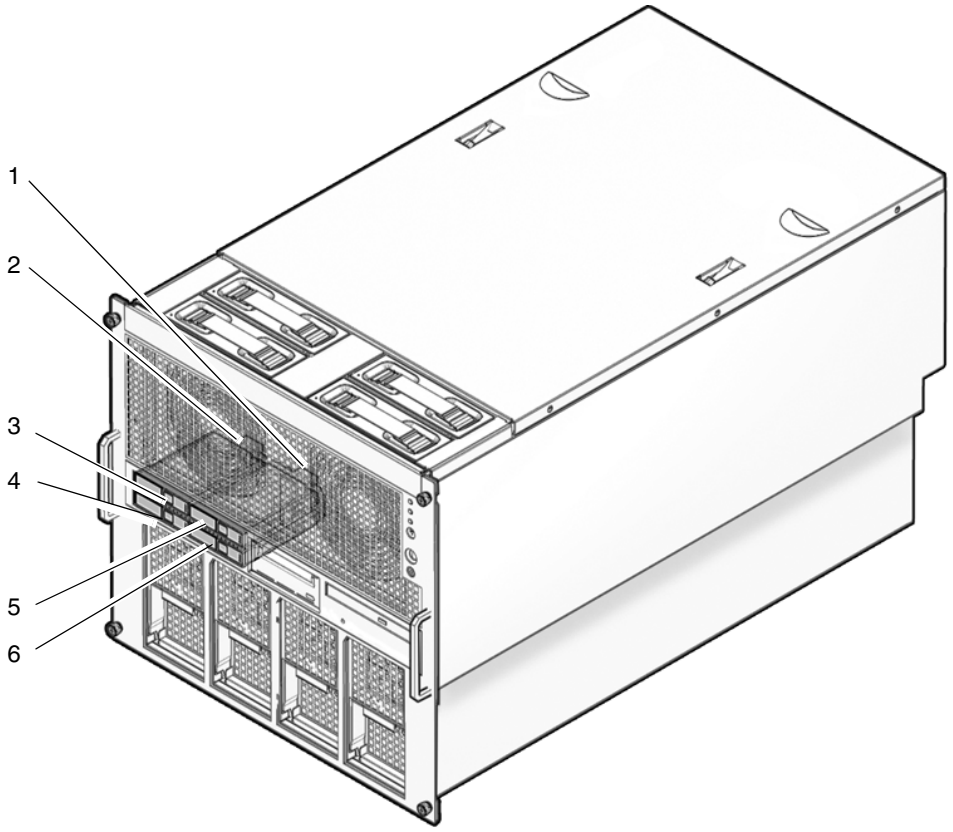
FIGURE 6-1 SPARC Enterprise M4000 Hard Disk Drives and Hard Disk Drive Backplane Locations



Location Number	Component
1	Hard disk drive backplane (HDDBP#0 IOU#0)
2	Hard disk drive (HDD#1)
3	Hard disk drive (HDD#0)

The following illustration shows the locations of the hard disk drives and the hard disk drive backplane on the SPARC Enterprise M5000 server.

FIGURE 6-2 SPARC Enterprise M5000 Hard Disk Drives and Hard Disk Drive Backplane Locations



Location Number	Component
1	Hard disk drive backplane (HDDBP#1 IOU#1)
2	Hard disk drive backplane (HDDBP#0 IOU#0)
3	Hard disk drive (HDD#1)
4	Hard disk drive (HDD#0)
5	Hard disk drive (HDD#3)
6	Hard disk drive (HDD#2)

6.1.1 Accessing the Hard Disk Drive

Note – If the hard disk drive is the boot device, the hard disk will have to be replaced using cold replacement procedures. However, active replacement can be used if the boot disk can be isolated from the Solaris OS by disk mirroring software and other software. See "Cold Replacement (Powering the Server Off and On)" on page 4-12.

- **Remove the hard disk drive from the domain.**

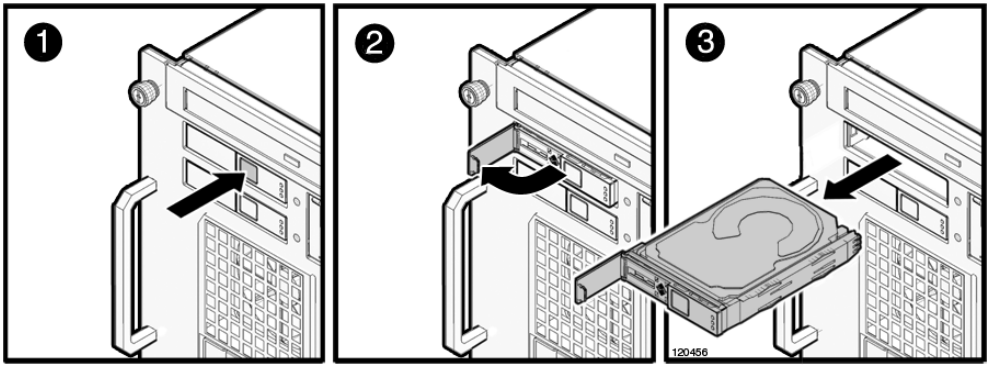
  This step includes using the `cfgadm` command to determine the Ap_Id and disconnecting the hard disk drive. See "Removing a FRU From a Domain" on page 4-4.

6.1.2 Removing the Hard Disk Drive

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Push the button on the front of the hard disk drive to release the drive latch (**FIGURE 6-3**).**
2. **Pull the latch so that it is straight out from the hard disk drive to unseat the drive.**
3. **Remove the hard disk drive and place it on the ESD mat.**

FIGURE 6-3 Removing the Hard Disk Drive



6.1.3 Installing the Hard Disk Drive

Caution – *Do not force* the hard disk drive into the slot. Doing so can cause damage to the component and server.

1. **Pull the latch so that it is straight out from the drive.**
2. **Align the drive in the slot and push it gently into position until it stops.**
3. **Secure the latch.**

6.1.4 Securing the Server

1. **Add the hard disk drive drive to the domain.**

   This step includes using the `cfgadm` command to connect and confirm the hard disk drive has been added to the domain. See "Adding a FRU Into a Domain" on page 4-5.

2. **Verify the state of the status LEDs on the hard disk drive.**

6.1.5 Accessing the Hard Disk Drive Backplane of the SPARC Enterprise M4000 Server

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the fan cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, removing the 60-mm fan units and removing the fan cover. See "Removing the Fan Cover" on page 5-8.

6.1.6 Removing the Hard Disk Drive Backplane of the SPARC Enterprise M4000 Server

1. **Remove the CD-RW/DVD-RW Drive Unit and place it on the ESD mat.**

   See "Removing the CD-RW/DVD-RW Drive Unit" on page 6-15.

2. **Remove the power and serial cables from the rear of the CD-RW/DVD-RW Drive Backplane.**

3. **Loosen the captive screw that holds the rear of the CD-RW/DVD-RW Drive Backplane in place.**

4. **Remove the CD-RW/DVD-RW backplane and place it on the ESD mat.**

5. **Remove all hard disk drives and place them on the ESD mat.**

   See "Removing the Hard Disk Drive" on page 6-4.

6. **Remove the power cable (p3) from the rear of the hard disk drive backplane.**
7. **Loosen the captive screw that holds the hard disk drive backplane in place.**
8. **Lift the hard disk drive backplane from the guide pins.**
9. **Remove the blue serial cable from the hard disk drive backplane and place the backplane on the ESD mat.**

6.1.7 Installing the Hard Disk Drive Backplane of the SPARC Enterprise M4000 Server

1. **Secure the blue serial cable to the hard disk drive backplane.**
2. **Place the hard disk drive backplane onto the guide pins.**
3. **Tighten the captive screw that holds down the rear of the hard disk drive backplane in place.**
4. **Secure the power cable (p3) to the rear of the hard disk drive backplane.**

Caution – *Do not force* any components into server slots. Doing so can cause damage to the component and server.

5. **Install the hard disk drives.**

   See "Installing the Hard Disk Drive" on page 6-5.

6. **Place the CD-RW/DVD-RW backplane onto the guide pin.**
7. **Tighten the captive screw that holds the rear of the CD-RW/DVD-RW Drive Backplane in place.**
8. **Connect the power and serial cables to the rear of the CD-RW/DVD-RW Drive Backplane.**
9. **Install the CD-RW/DVD-RW Drive Unit.**

   See "Installing the CD-RW/DVD-RW Drive Unit" on page 6-16.

6.1.8 Securing the Server

1. **Install the fan cover.**

   This step includes replacing the fan cover, installing the 60-mm fan units, sliding the server in to the equipment rack and restoring the rack antitilt features to their original position. See "Replacing the Fan Cover" on page 5-10.

2. **Power the server on.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

3. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

6.1.9 Accessing the Hard Disk Drive Backplane of the SPARC Enterprise M5000 Server

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – The motherboard unit is heavy. Two people are recommended to lift the unit. If the unit is too heavy the memory boards can be removed prior to lifting the unit.

3. **Remove the motherboard unit.**

   This step includes removing the CPU modules and filler panels, removing the busbar screws, and removing the motherboard cradle. See "Removing the SPARC Enterprise M5000 Motherboard Unit" on page 13-8.

6.1.10 Removing the Hard Disk Drive Backplane of the SPARC Enterprise M5000 Server

Note – The fan units and fan cage can be removed for increased visibility of the hard disk drive backplane if necessary.

1. **Remove the hard disk drive and place it on the ESD mat.**

   See "Removing the Hard Disk Drive" on page 6-4.

2. **Disconnect the power cable (p3) from the rear of the hard disk drive backplane.**
3. **Disconnect the blue serial cable from the hard disk drive backplane.**
4. **Loosen the captive screw and lift the hard disk drive backplane from the guide pins and place the backplane on the ESD mat.**

6.1.11 Installing the Hard Disk Drive Backplane of the SPARC Enterprise M5000 Server

1. **Place the hard disk drive backplane on the guide pins.**
2. **Tighten the captive screw that holds the rear of the hard disk drive backplane in place.**
3. **Connect the power cable (p3) to the rear of the hard disk drive backplane.**
4. **Connect the blue serial cable to the hard disk drive backplane.**

Caution – *Do not force* any components into server slots. Doing so can cause damage to the component and server.

5. **Install the hard drive.**

   See "Installing the Hard Disk Drive" on page 6-5.

6.1.12 Securing the Server

Caution – The motherboard unit is heavy. Two people are recommended to lift the unit.

1. **Install the motherboard unit.**

   This step includes installing the motherboard cradle, securing the busbar screws, and installing the CPU modules and filler panels See "Installing the SPARC Enterprise M5000 Motherboard Unit" on page 13-10.

2. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the rack antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

3. **Power the server on.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

4. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

6.2 CD-RW/DVD-RW Drive Unit (DVDU) Replacement

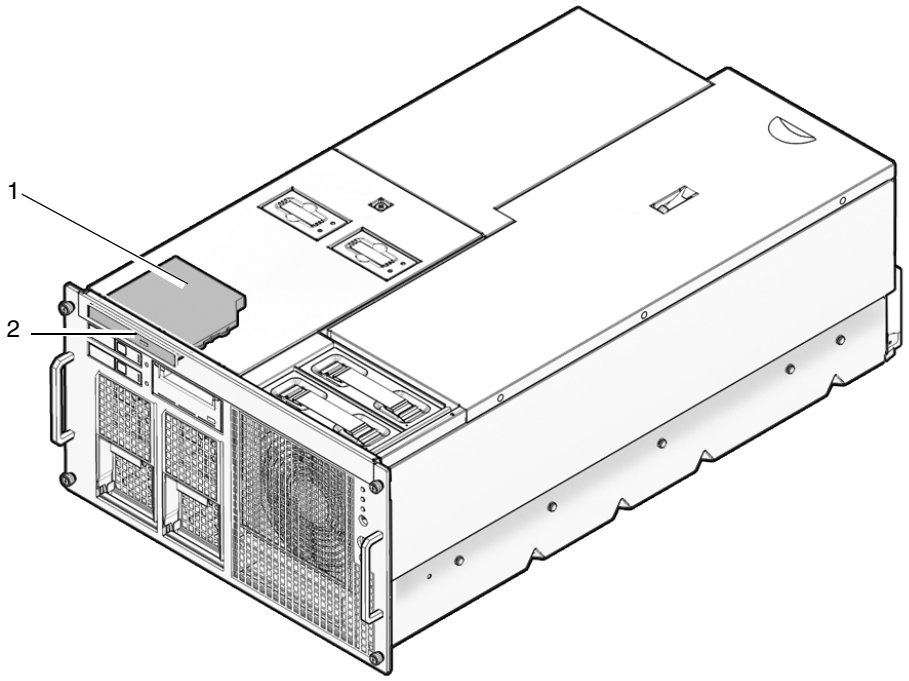
The CD-RW/DVD-RW drive unit and CD-RW/DVD-RW backplane are cold or hot replacement components.The CD-RW/DVD-RW drive units are identical on both midrange servers.

Information on CD-RW/DVD-RW drive units and CD-RW/DVD-RW backplanes is organized into the following sections:

- "Accessing the CD-RW/DVD-RW Drive Unit" on page 6-15
- "Removing the CD-RW/DVD-RW Drive Unit" on page 6-15
- "Installing the CD-RW/DVD-RW Drive Unit" on page 6-16
- "Securing the Server" on page 6-16
- "Accessing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-17
- "Removing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-17
- "Installing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-18
- "Securing the Server" on page 6-18
- "Accessing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M5000 Server" on page 6-19
- "Removing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M5000 Server" on page 6-20
- "Installing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M5000 Server" on page 6-20
- "Securing the Server" on page 6-21

FIGURE 6-4 shows the location of the CD-RW/DVD-RW drive unit and CD-RW/DVD-RW backplane on the SPARC Enterprise M4000 server.

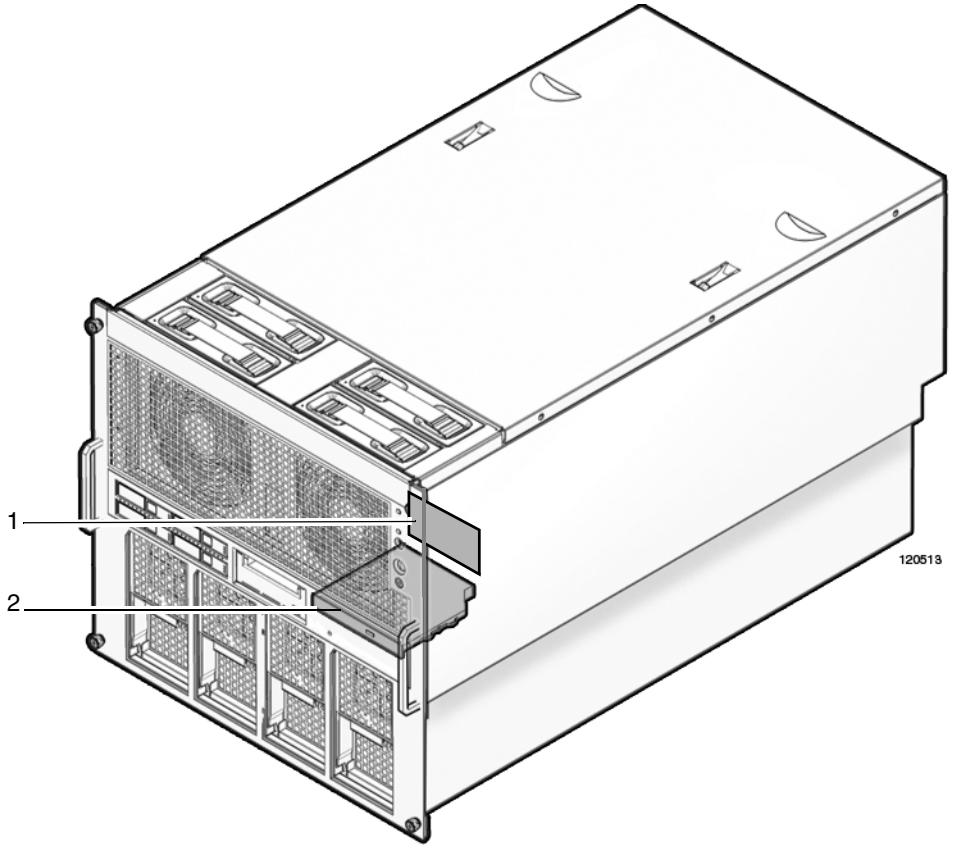
FIGURE 6-4 SPARC Enterprise M4000 CD-RW/DVD-RW Drive Unit and CD-RW/DVD-RW Backplane Locations



Location Number	Component
1	CD-RW/DVD-RW Backplane (DVDBP)
2	CD-RW/DVD-RW Drive Unit (DVDU)

FIGURE 6-5 shows the location of the CD-RW/DVD-RW drive unit and CD-RW/DVD-RW backplane on the SPARC Enterprise M5000 server.

FIGURE 6-5 SPARC Enterprise M5000 CD-RW/DVD-RW Drive Unit and CD-RW/DVD-RW Backplane Locations



Location Number	Component
1	CD-RW/DVD-RW Backplane (DVDBP)
2	CD-RW/DVD-RW Drive Unit (DVDU)

6.2.1 Accessing the CD-RW/DVD-RW Drive Unit

- **Power off the server.**

  This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

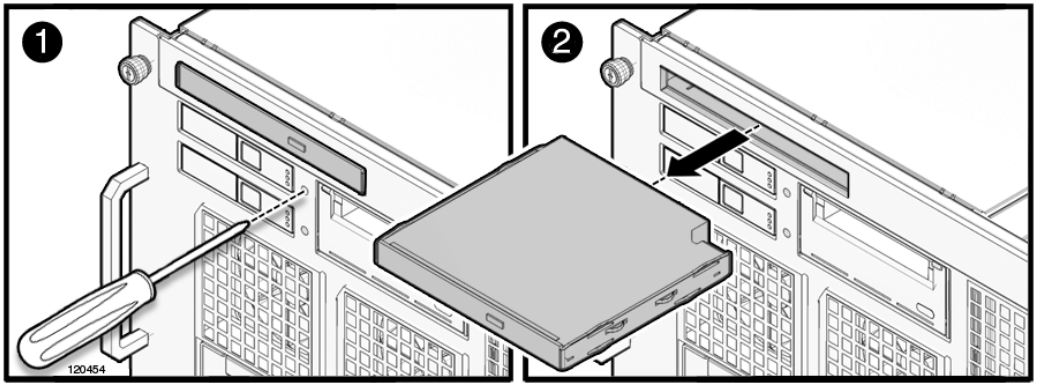
Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

6.2.2 Removing the CD-RW/DVD-RW Drive Unit

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Put a No. 1 screwdriver into the CD-RW/DVD-RW drive unit release hole to release the catch that holds the CD-RW/DVD-RW drive unit in place (FIGURE 6-6).**
2. **Remove the drive from the server and place it on the ESD mat.**

FIGURE 6-6 Removing the CD-RW/DVD-RW Drive Unit



6.2.3 Installing the CD-RW/DVD-RW Drive Unit

Caution – *Do not force* the CD-RW/DVD-RW Drive Unit into the slot. Doing so can cause damage to the component and server.

- **Place the CD-RW/DVD-RW Drive Unit into the drive slot and gently push it in until it locks in place.**

6.2.4 Securing the Server

1. **Power on the server.**

   This step includes reconnecting power cables, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

2. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

6.2.5 Accessing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the fan cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, removing the 60-mm fan units and removing the fan cover. See "Removing the Fan Cover" on page 5-8.

6.2.6 Removing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server

1. **Remove the CD-RW/DVD-RW Drive Unit from the server and place it on the ESD mat.**

   See "Removing the CD-RW/DVD-RW Drive Unit" on page 6-15.

2. **Remove the power and serial cables from the rear of the CD-RW/DVD-RW Drive Backplane.**

3. **Loosen the captive screw that holds the rear of the CD-RW/DVD-RW Drive Backplane in place.**

   The CD-RW/DVD-RW Drive Backplane is a unit that the CD-RW/DVD-RW Drive Unit slides into.

4. **Remove the CD-RW/DVD-RW Drive Backplane and place it on the ESD mat.**

6.2.7 Installing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server

1. **Place the CD-RW/DVD-RW Drive Backplane onto the guide pin.**
2. **Tighten the captive screw that holds the rear of the CD-RW/DVD-RW Drive Backplane in place.**
3. **Secure the power and serial cables to the rear of the CD-RW/DVD-RW Drive Backplane.**

Caution – *Do not force* the CD-RW/DVD-RW Drive Unit into a slot. Doing so can cause damage to the drive and server.

4. **Install the CD-RW/DVD-RW Drive Unit.**

   See "Installing the CD-RW/DVD-RW Drive Unit" on page 6-16.

6.2.8 Securing the Server

1. **Install the fan cover.**

   This step includes replacing the fan cover, installing the 60-mm fan units, sliding the server in to the equipment rack and restoring the rack antitilt features to their original position. See "Replacing the Fan Cover" on page 5-10.

2. **Power the server on.**

   This step includes reconnecting power cables, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

3. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

6.2.9 Accessing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M5000 Server

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – The motherboard unit is heavy. Two people are recommended to lift the unit. If the unit is too heavy the memory boards can be removed prior to lifting the unit.

3. **Remove the motherboard unit.**

   This step includes removing the CPU modules and filler panels, removing the busbar screws, and removing the motherboard cradle. See "Removing the SPARC Enterprise M5000 Motherboard Unit" on page 13-8

6.2.10 Removing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M5000 Server

Note – The fan units and fan cage can be removed for increased visibility of the CD-RW/DVD-RW Drive Backplane if necessary.

1. **Remove the CD-RW/DVD-RW Drive Unit from the server and place it on the ESD mat.**

   See "Removing the CD-RW/DVD-RW Drive Unit" on page 6-15.

2. **Disconnect the power and serial cables from the rear of the CD-RW/DVD-RW Drive Backplane.**

3. **Loosen the captive screw that secures the CD-RW/DVD-RW Drive Backplane in place.**

   The screw is beneath the power signal cables.

4. **Remove the CD-RW/DVD-RW Drive Backplane from the server and place it on the ESD mat.**

6.2.11 Installing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M5000 Server

1. **Place the CD-RW/DVD-RW Drive Backplane onto the guide pin.**

2. **Tighten the captive screw to secure the CD-RW/DVD-RW Drive Backplane in place.**

   The screw secures beneath the power signal cables.

3. **Connect the power and serial cables to the rear of the CD-RW/DVD-RW Drive Backplane.**

Caution – *Do not force* the CD-RW/DVD-RW Drive Unit into a slot. Doing so can cause damage to the drive and server.

4. **Install the CD-RW/DVD-RW Drive Unit.**

   See "Installing the CD-RW/DVD-RW Drive Unit" on page 6-16.

6.2.12 Securing the Server

Caution – The motherboard unit is heavy. Two people are recommended to lift the unit.

1. **Install the motherboard unit.**

   This step includes installing the motherboard cradle, securing the busbar screws, and installing the CPU modules and filler panels See "Installing the SPARC Enterprise M5000 Motherboard Unit" on page 13-10.

2. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

3. **Power the server on.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

4. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

6.3 Tape Drive Unit Replacement

The tape drive unit is an active, hot, or cold replacement component. The tape drive backplane (TAPEBP) is a cold replacement component. The tape drives are identical on both midrange servers. On the SPARC Enterprise M4000 server the CD-RW/DVD-RW Drive Backplane must be removed to access the tape drive backplane.

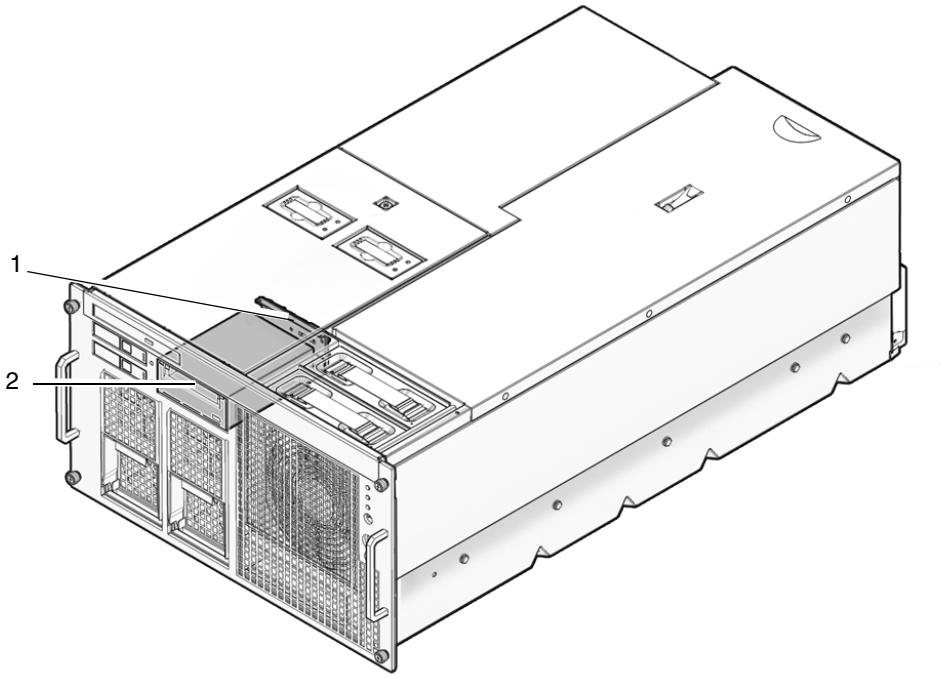
Contact your sales representative for tape drive unit options on SPARC Enterprise M4000/M5000 servers.

Information on tape drives and tape drive backplanes is organized into the following sections:

- "Accessing the Tape Drive Unit" on page 6-25
- "Removing the Tape Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-28
- "Installing the Tape Drive Unit" on page 6-26
- "Securing the Server" on page 6-29
- "Accessing the Tape Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-27
- "Removing the Tape Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-28
- "Installing the Tape Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-28
- "Securing the Server" on page 6-29
- "Accessing the Tape Drive Backplane of the SPARC Enterprise M5000 Server" on page 6-30
- "Removing the Tape Drive Backplane of the SPARC Enterprise M5000 Server" on page 6-31
- "Installing the Tape Drive Backplane of the SPARC Enterprise M5000 Server" on page 6-31
- "Securing the Server" on page 6-32

FIGURE 6-7 shows the location of the tape drive unit and tape drive backplane (TAPEBP) on the SPARC Enterprise M4000 server.

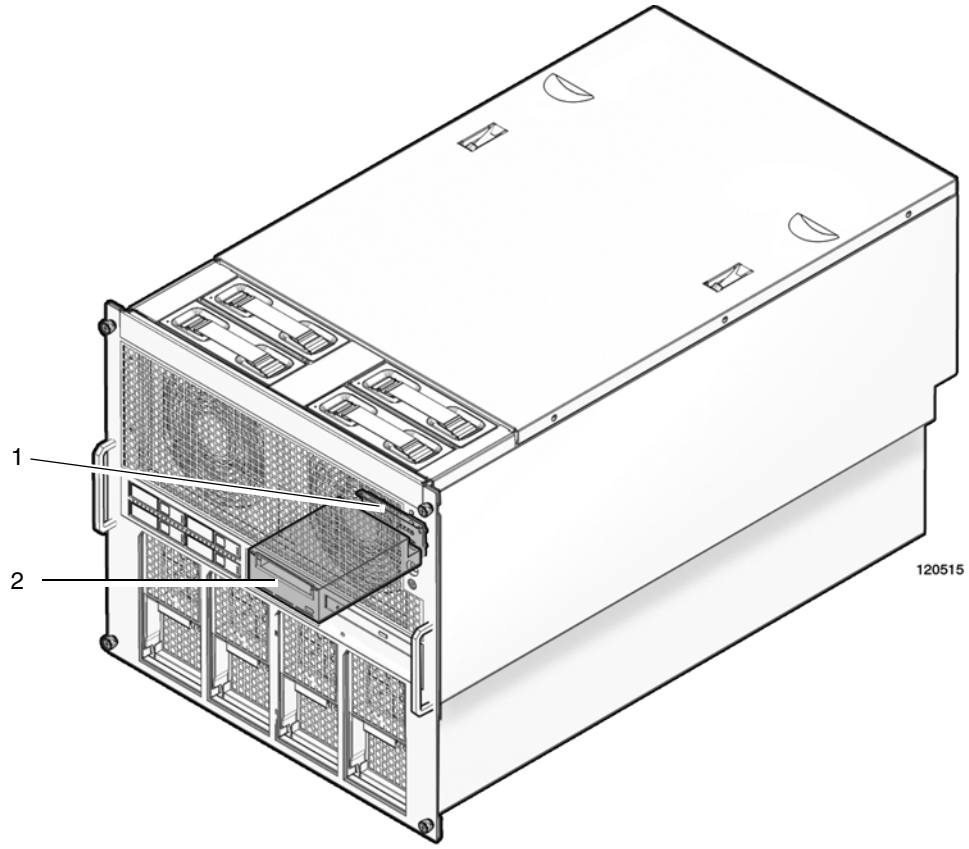
FIGURE 6-7 SPARC Enterprise M4000 Tape Drive Unit and Tape Drive Backplane Locations



Location Number	Component
1	Tape drive backplane (TAPEBP)
2	Tape drive unit(TAPEU)

FIGURE 6-8 shows the location of the tape drive unit and tape drive backplane (TAPEBP) on the SPARC Enterprise M5000 server.

FIGURE 6-8 SPARC Enterprise M5000 Tape Drive Unit and Tape Drive Backplane Locations



Location Number	Component
1	Tape drive backplane (TAPEBP)
2	Tape drive unit(TAPEU)

6.3.1 Accessing the Tape Drive Unit

- **Remove the tape drive unit from the domain.**

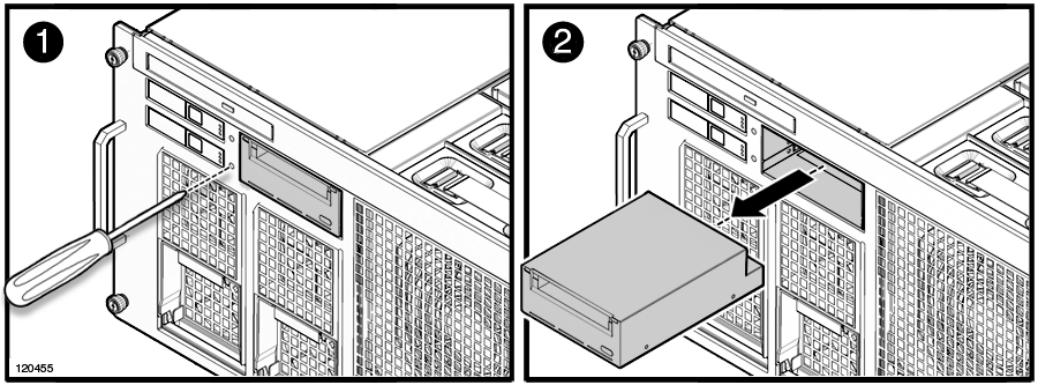
  This step includes using the `cfgadm` command to determine the Ap_Id and disconnecting the tape drive. See "Removing a FRU From a Domain" on page 4-4.

6.3.2 Removing the Tape Drive Unit

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Put a No. 1 screwdriver into the tape drive unit release hole to release the catch that holds the tape drive unit in place (**FIGURE 6-9**).**
2. **Remove the drive from the server and place it on the ESD mat.**

FIGURE 6-9 Removing the Tape Drive



6.3.3 Installing the Tape Drive Unit

Caution – *Do not force* the tape drive unit into the slot. Doing so can cause damage to the component and server.

- **Place the tape drive unit into the slot and gently push it in until it locks in place.**

6.3.4 Securing the Server

1. **Add the tape drive unit to the domain.**

   This step includes using the `cfgadm` command to connect and confirm the tape drive unit has been added to the domain. See "Adding a FRU Into a Domain" on page 4-5.

2. **Verify the state of the status LEDs on the tape drive.**

6.3.5 Accessing the Tape Drive Backplane of the SPARC Enterprise M4000 Server

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the fan cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, removing the 60-mm fan units and removing the fan cover. See "Removing the Fan Cover" on page 5-8.

3. **Remove the 60-mm fan backplane.**

   This step includes removing the cable connectors, loosening the captive screws and removing the 60-mm fan backplane. See "Removing the 60-mm Fan Backplane" on page 10-11.

6.3.6 Removing the Tape Drive Backplane of the SPARC Enterprise M4000 Server

1. **Remove the CD-RW/DVD-RW Drive Backplane.**

This step includes removing the CD-RW/DVD-RW Drive Unit and the CD-RW/DVD-RW Drive Backplane. See "Removing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-17.

2. **Remove the tape drive unit from the server and place it on the ESD mat.**

   See "Removing the Tape Drive Unit" on page 6-25.

3. **Remove the power cable (p4) from the tape drive backplane.**
4. **Disconnect the blue serial cable from the tape drive backplane.**
5. **Loosen the captive screw that holds the tape drive backplane (TAPEBP) in place and lift the tape drive backplane (TAPEBP) from the guide pins and place the backplane on the ESD mat.**

6.3.7 Installing the Tape Drive Backplane of the SPARC Enterprise M4000 Server

1. **Place the tape drive backplane (TAPEBP) onto the guide pins.**
2. **Tighten the captive screw that holds the tape drive backplane (TAPEBP) in place.**
3. **Connect the blue serial cable to the tape drive backplane.**
4. **Connect the power cable (p4) to the tape drive backplane.**

Caution – *Do not force* any components into server slots. Doing so can cause damage to the component and server.

5. **Install the tape drive.**

   See "Installing the Tape Drive Unit" on page 6-26.

6. **Install the CD-RW/DVD-RW Drive Backplane.**

   This step includes installing the CD-RW/DVD-RW Drive Backplane and the CD-RW/DVD-RW Drive Unit. See "Installing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-18.

6.3.8 Securing the Server

1. **Install the 60-mm fan backplane.**

   This step includes installing the 60-mm fan backplane, tightening the captive screws, and securing the cable connectors. See "Installing the 60-mm Fan Module" on page 10-6.

2. **Install the fan cover.**

   This step includes replacing the fan cover, installing the 60-mm fan units, sliding the server in to the equipment rack and restoring the rack antitilt features to their original position. See "Replacing the Fan Cover" on page 5-10.

3. **Power the server on.**

   This step includes reconnecting power cables and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

4. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

6.3.9 Accessing the Tape Drive Backplane of the SPARC Enterprise M5000 Server

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – The motherboard unit is heavy. Two people are recommended to lift the unit. If the unit is too heavy the memory boards can be removed prior to lifting the unit.

3. **Remove the motherboard unit.**

   This step includes removing the CPU modules and filler panels, removing the busbar screws, and removing the motherboard cradle. See "Removing the SPARC Enterprise M5000 Motherboard Unit" on page 13-8.

6.3.10 Removing the Tape Drive Backplane of the SPARC Enterprise M5000 Server

Note – The fan units and fan cage can be removed for increased visibility of the Tape drive backplane if necessary.

1. **Loosen the two (2) captive screws that secure the air baffle and slide the air baffle towards the busbar to create working space to access the tape drive backplane.**
2. **Remove the tape drive unit from the server and place it on the ESD mat.**
   See "Removing the Tape Drive Unit" on page 6-25.
3. **Disconnect the serial cable from the rear of the tape drive backplane.**
4. **Disconnect the power cable from the rear of the tape drive backplane.**
5. **Loosen the captive screw that secures the tape drive backplane in place.**
6. **Remove the tape drive backplane.**

6.3.11 Installing the Tape Drive Backplane of the SPARC Enterprise M5000 Server

1. **Place the tape drive backplane into the server.**
2. **Tighten the captive screw that secures the tape drive backplane in place.**
3. **Secure the power cable to the tape drive backplane.**
4. **Secure the serial cable to the tape drive backplane.**

Caution – *Do not force* the drive into a slot. Doing so can cause damage to the drive and server.

5. **Place the tape drive unit into the drive slot and gently push it in until it locks in place.**
6. **Place the air baffle into position and tighten it in place using the two (2) captive screws.**

Note – Be certain no cables are pinched beneath the air baffle when it is secured.

6.3.12 Securing the Server

Caution – The motherboard unit is heavy. Two people are recommended to lift the unit.

1. **Install the motherboard unit.**

   This step includes installing the motherboard cradle, securing the busbar screws, and installing the CPU modules and filler panels See "Installing the SPARC Enterprise M5000 Motherboard Unit" on page 13-10.

2. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the rack antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

3. **Power the server on.**

   This step includes reconnecting power cables and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

4. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

CHAPTER 7

Power Systems Replacement

This chapter describes the power supply units and how to remove and replace them. This information is organized into the following topic:

- "Power Supply Unit Replacement" on page 7-1

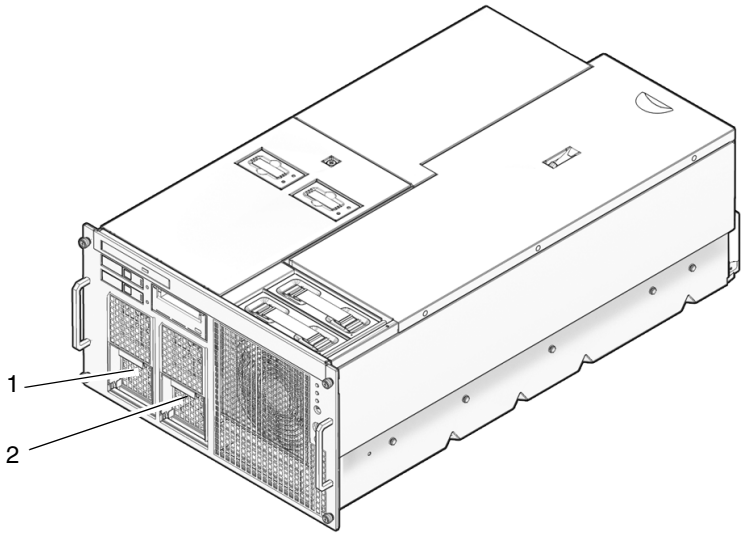
7.1 Power Supply Unit Replacement

Power supply units are hot, active, or cold replacement components. Power supply units are hot, active, or cold replacement components. When using active replacement, only one power supply unit should be replaced at a time to ensure redundancy.

The power supply unit backplane is part of the backplane unit. See "Backplane Unit Replacement" on page 14-1 for remove and replace procedures.

FIGURE 7-1 shows the locations of the power supply unit on the SPARC Enterprise M4000 server.

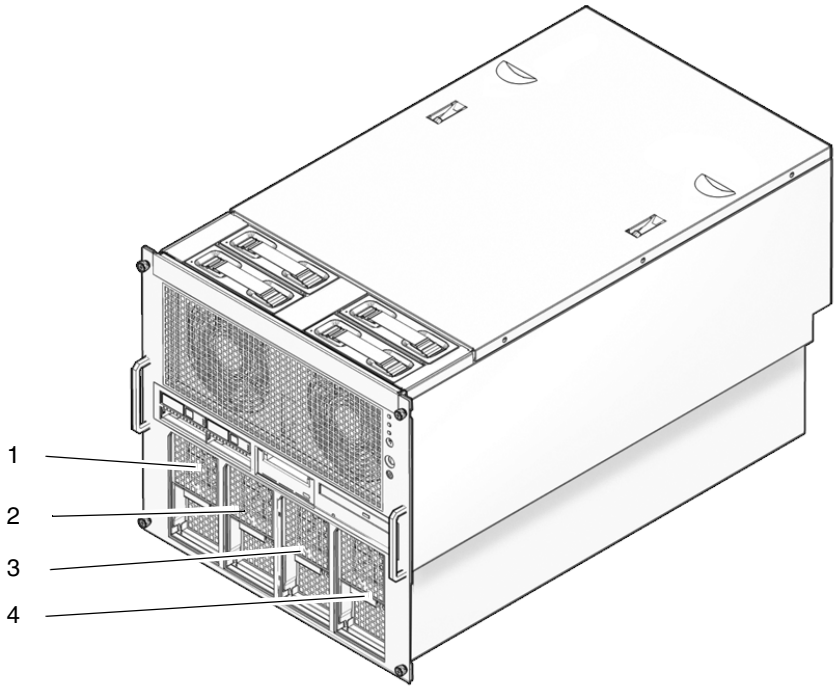
FIGURE 7-1 SPARC Enterprise M4000 Power Supply Unit Locations



Location Number	Component
1	Power supply unit (PSU#0)
2	Power supply unit (PSU#1)

FIGURE 7-2 shows the locations of the power supply units on the SPARC Enterprise M5000 server.

FIGURE 7-2 SPARC Enterprise M5000 Power Supply Unit Locations



Location Number	Component
1	Power supply unit (PSU#0)
2	Power supply unit (PSU#1)
3	Power supply unit (PSU#2)
4	Power supply unit (PSU#3)

7.1.1 Accessing the Power Supply Unit

- **From the XSCF Shell prompt, use the `replacefru` command to disable the power supply to be removed.**

```
XSCF> replacefru
```

The `replacefru` command is menu-driven. `replacefru` will continue while the power supply is removed and then it will test the power supply. Refer to "Removing and Replacing a FRU" on page 4-7 for more information.

7.1.2 Removing the Power Supply Unit

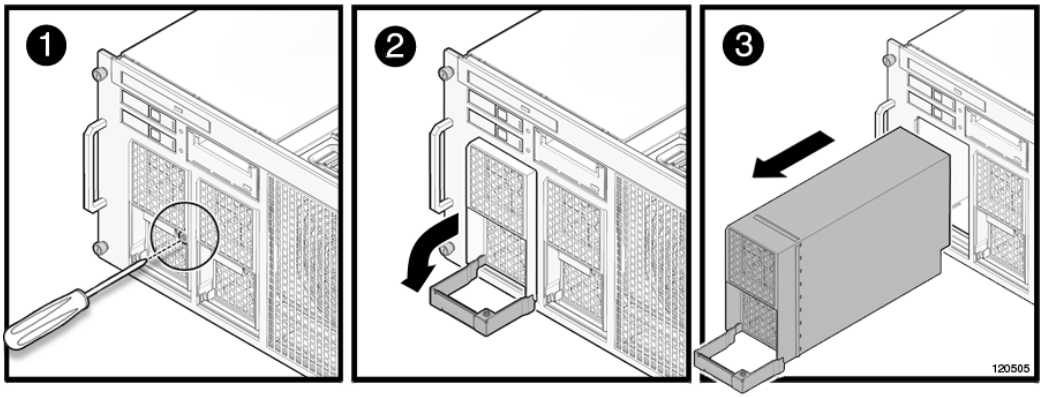
Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Confirm the DC_OK LED is not lit.**
2. **If the DC_OK LED remains lit push a paperclip through the pin-hole to activate the standby switch.**
3. **Loosen the captive screw on the power supply unit (**FIGURE 7-3**).**
4. **Pull the handle down perpendicular to the server to unseat the unit.**

Note – Support the bottom of the unit with one hand to avoid the rear of the unit swinging and hitting the system as it is removed.

5. **Pull the unit from the server and place it on the ESD mat.**

FIGURE 7-3 Removing the Power Supply Unit



7.1.3 Installing the Power Supply Unit

Caution – *Do not force* the power supply unit into the slot. Doing so can cause damage to the component and server.

1. **Align the top of the unit against the top of the slot.**

   This prevents clipping the power connectors at the bottom of the unit against the bottom of the slot.

2. **With the handle perpendicular to the server, push the unit into the slot.**
3. **Lift the handle upwards all the way to seat the unit.**
4. **Tighten the captive screw on the power supply unit.**

7.1.4 Securing the Server

- **From the XSCF Shell prompt, use the `showhardconf` command to confirm that the new power supply is installed.**

```
XSCF> showhardconf
```

Refer to "Verifying Hardware Operation" on page 4-9 for more information.

CHAPTER 8

I/O Unit Replacement

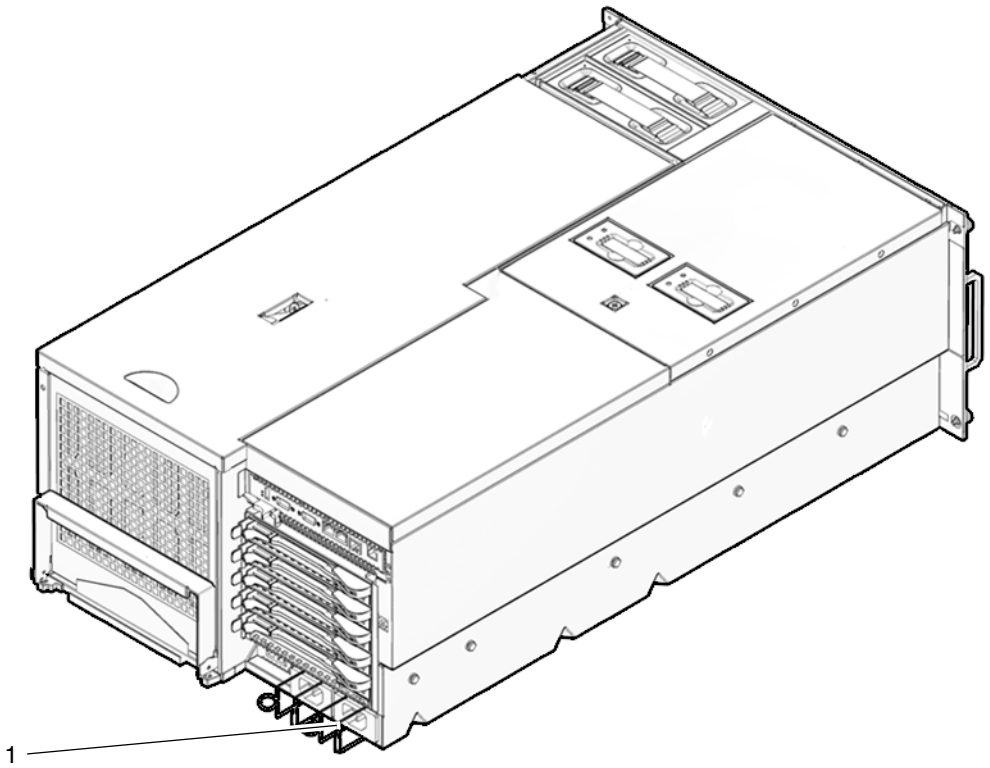
This chapter describes how to remove and install the I/O unit and PCI cassettes. The information is organized into the following topics:

- "PCI Cassette Replacement" on page 8-4
- "PCI Card Replacement" on page 8-7
- "I/O Unit Replacement" on page 8-10
- "I/O Unit DC-DC Converter Replacement" on page 8-12

The I/O units are accessed from the rear of the server. The I/O unit backplane is part of the backplane unit. See "Backplane Unit Replacement" on page 14-1 for remove and replace procedures.

FIGURE 8-1 shows the I/O unit location on the SPARC Enterprise M4000 server.

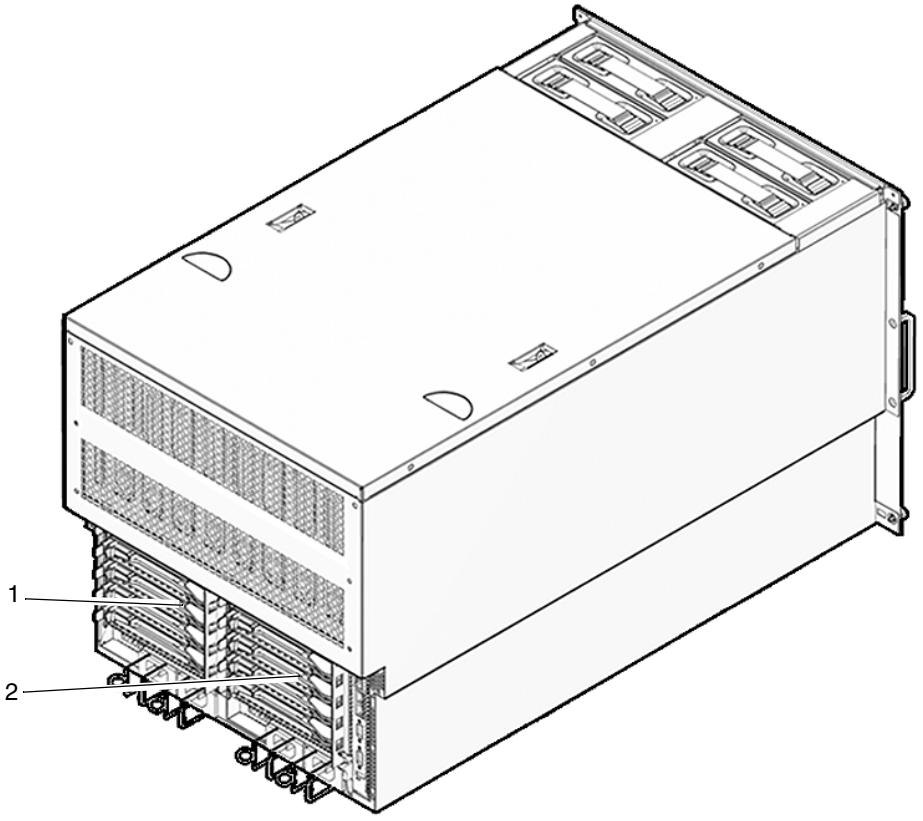
FIGURE 8-1 SPARC Enterprise M4000 I/O Unit Location (Rear)



Location Number	Component
1	I/O unit (IOU#0)

FIGURE 8-2 shows the I/O unit locations on the SPARC Enterprise M5000 server.

FIGURE 8-2 SPARC Enterprise M5000 I/O Unit Locations (Rear)



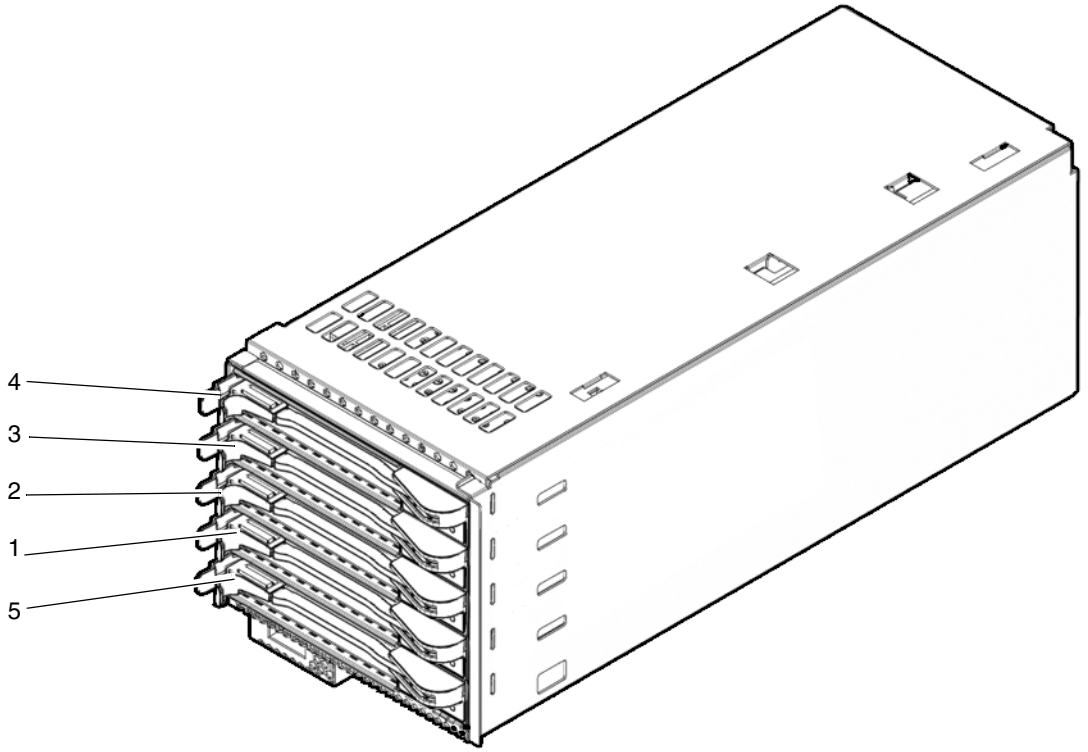
Location Number	Component
1	I/O unit (IOU#1)
2	I/O unit (IOU#0)

8.1 PCI Cassette Replacement

PCI cassettes are hot, active, or cold replacement components.

FIGURE 8-3 shows the PCI cassette slot locations.

FIGURE 8-3 PCI Cassette Slot Locations



Location Number	Component
1	PCI cassette #1 (PCIe)
2	PCI cassette #2 (PCIe)
3	PCI cassette #3 (PCIe)
4	PCI cassette #4 (PCIe)
5	PCI cassette #0 (PCI-X)

Note – Do not install an I/O Box link card (or any PCIe card sensitive to timing delays) in the slot marked PCI cassette #1 in FIGURE 8-3.

8.1.1 Accessing the PCI Cassette

Before you remove the PCI cassette, make sure that there is no I/O activity on the card in the cassette.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

- **Remove the PCI cassette from the system.**

  This step includes using the `cfgadm` command to determine the Ap_Id and disconnecting the PCI cassette. See "Removing a FRU From a Domain" on page 4-4.

8.1.2 Removing the PCI Cassette

1. **Label and disconnect cables from the PCI cassette.**

Caution – On the PCI cassette, when removing cables such as LAN cable, if your finger cannot reach the latch lock of the connector, press the latch with a flathead screwdriver to remove the cable. Forcing your finger into the clearance can cause damage to the PCI card.

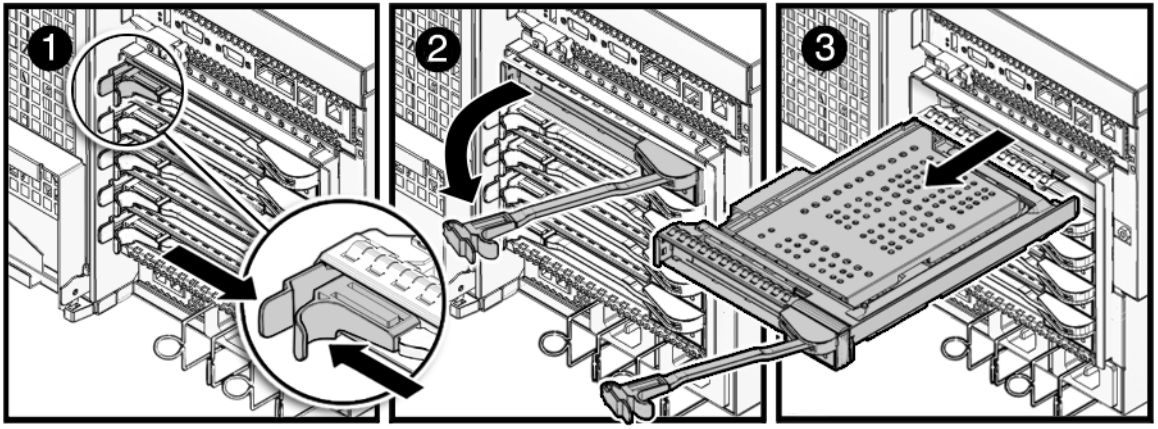
Caution – When removing cables such as LAN cable, if your finger can't reach the latch lock of the connector, press the latch with a flathead screwdriver to remove the cable. Forcing your finger into the clearance can cause damage to the PCI card. Pinch the handle together to release the lever (FIGURE 8-4).

2. **Push the lever to the right to unseat the PCI cassette.**

3. **Remove the PCI cassette from the slot and place it on the ESD mat.**

Note – When the PCI cassette is removed with the `cfgadm` command, the PCI cassette is isolated from the Solaris OS and the power to the PCI card is automatically turned off.

FIGURE 8-4 Removing the PCI Cassette



8.1.3 Installing the PCI Cassette

Caution – *Do not force* the PCI cassette into a slot. Doing so can cause damage to the cassette and server.

---

1. **Align the PCI cassette on the gray plastic guide and install it into the slot.**
2. **Lock the lever into place to seat the cassette.**

Note – As the lever is moved pressure will build up, then just prior to locking into place the pressure will suddenly release. If the lever locks in place without the pressure release, the card may not be seated correctly. If this happens the card should be removed and reinstalled.

Note – When you insert the PCI cassette using hot-swap, the cassette is automatically powered on and configured. Check that the POWER LED on the cassette is *lit* to be certain the cassette is correctly seated.

3. **Connect all cables to the PCI cassette and reconnect the cable management arm if necessary.**

8.1.4 Securing the Server

1. **Add the PCI cassette to the system.**

   This step includes using the `cfgadm` command to connect and confirm the PCI cassette has been added to the system. See "Adding a FRU Into a Domain" on page 4-5.

2. **Verify the state of the status LEDs on the PCI cassette.**

   The green POWER LED should be On and the CHECK LED should not be On.

8.2 PCI Card Replacement

The PCI card mounts in the PCI cassette.

8.2.1 Removing the PCI Card

1. **Remove the PCI cassette containing the PCI card from the server.**

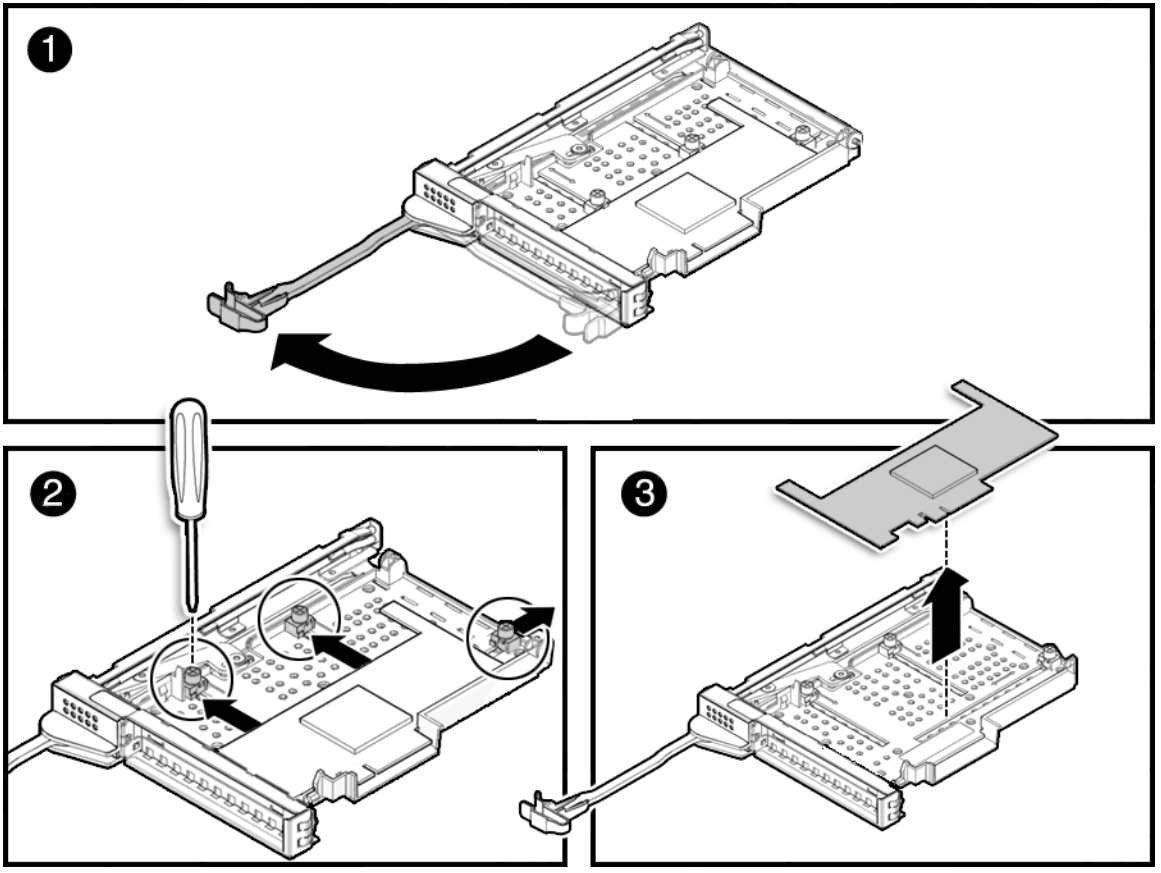
   See "Removing the PCI Cassette" on page 8-5.

2. **Open the cassette lever until it is horizontal (**FIGURE 8-5**).**

3. **Loosen the three (3) captive screws on the adjustable stops with a screwdriver and move the adjustable stops away from the PCI card.**

4. **Remove the PCI card from the cassette and place it on the ESD mat.**

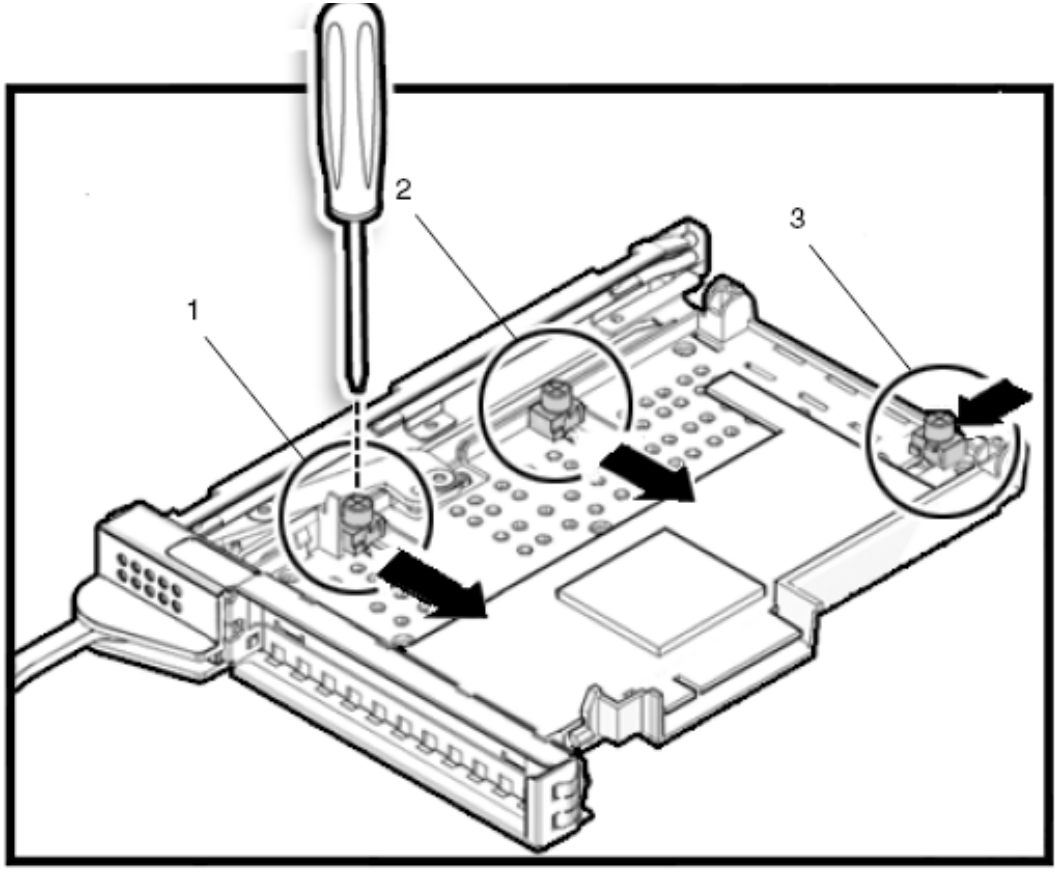
FIGURE 8-5 PCI Card Mounted in PCI Cassette



8.2.2 Installing the PCI Card

1. **Loosen the three (3) captive screws on the adjustable stops with a screwdriver and move the adjustable stops to make space for the PCI card.**
2. **Open the cassette lever until horizontal and push the plastic cassette body towards the metal base to make room for the PCI card.**
3. **Place the PCI card into the cassette.**
4. **Slide the adjustable stops into position against the PCI card to hold it in place and secure them with a screwdriver.**

FIGURE 8-6 Sequence of Adjusting the PCI Card in Position



Note – The adjustable stops should be snug against the card and securely tightened to ensure the card seats correctly. Also, fix the PCI card in position by following the 1-2-3 sequence in FIGURE 8-6.

---

5. **Install the PCI cassette containing the PCI card into the server.**

   See "Installing the PCI Cassette" on page 8-6.

8.3 I/O Unit Replacement

The I/O units are cold replacement components.

8.3.1 Accessing the I/O Unit

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

- **Power off the server.**

This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

8.3.2 Removing the I/O Unit

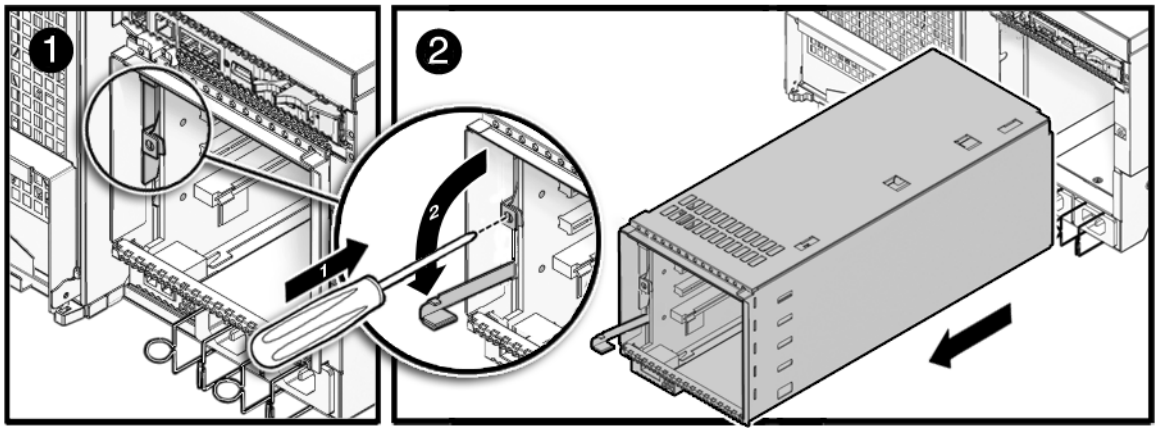
Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Disconnect and label all the cables that connect to the I/O unit.**
2. **Remove the cassettes from the I/O unit.**

   See "Removing the PCI Cassette" on page 8-5.
3. **Disconnect the cabinet end of the cable management arm.**

4. **Using a No. 1 screwdriver, press the lock button on the left side of the I/O unit to free the unit release lever (FIGURE 8-5).**
5. **Lower the unit release lever to unseat the I/O unit.**
6. **Remove the I/O unit from the slot and place it on the ESD mat.**

FIGURE 8-7 Removing the I/O Unit



8.3.3 Installing the I/O Unit

Caution – *Do not force* the I/O unit into a slot. Doing so can cause damage to the component and server.

1. **Place the rear of the I/O unit onto the lip of the slot.**
2. **Slide the I/O unit into the slot.**
3. **Raise the I/O unit release lever to seat the unit.**
4. **Connect the free end of the cable management arm to the cabinet.**
5. **Install the cassettes in the I/O unit.**
   See "Installing the PCI Cassette" on page 8-6.
6. **Connect all cables to the I/O unit.**

8.3.4 Securing the Server

1. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server Off Using Software" on page 4-12.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

2. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

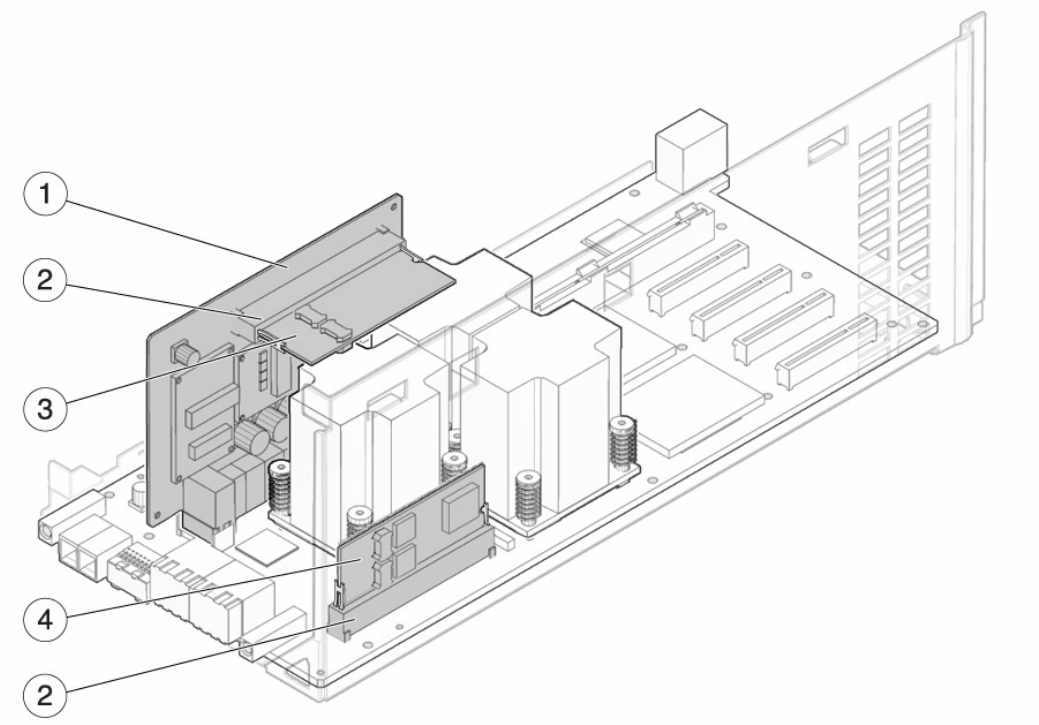
   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

8.4 I/O Unit DC-DC Converter Replacement

The DC-DC converters are cold replacement components. This means the entire server must be powered off and the power cords disconnected to replace a DC-DC converter on the I/O unit.

FIGURE 8-8 shows the location of the I/O unit DC-DC converter, the DC-DC Converter Connector, and the DC-DC Converter Riser.

FIGURE 8-8 I/O Unit DC-DC Converter, DC-DC Converter Connector, and DC-DC Converter Riser Location



Location Number	Component
1	DC-DC Converter Riser (DDCR)
2	DC-DC Converter Connector
3	DC-DC Converter (DDC_B#0)
4	DC-DC Converter (DDC_A#0)

8.4.1 Accessing the I/O Unit DC-DC Converter (DDC_A#0 or DDC_B#0)

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

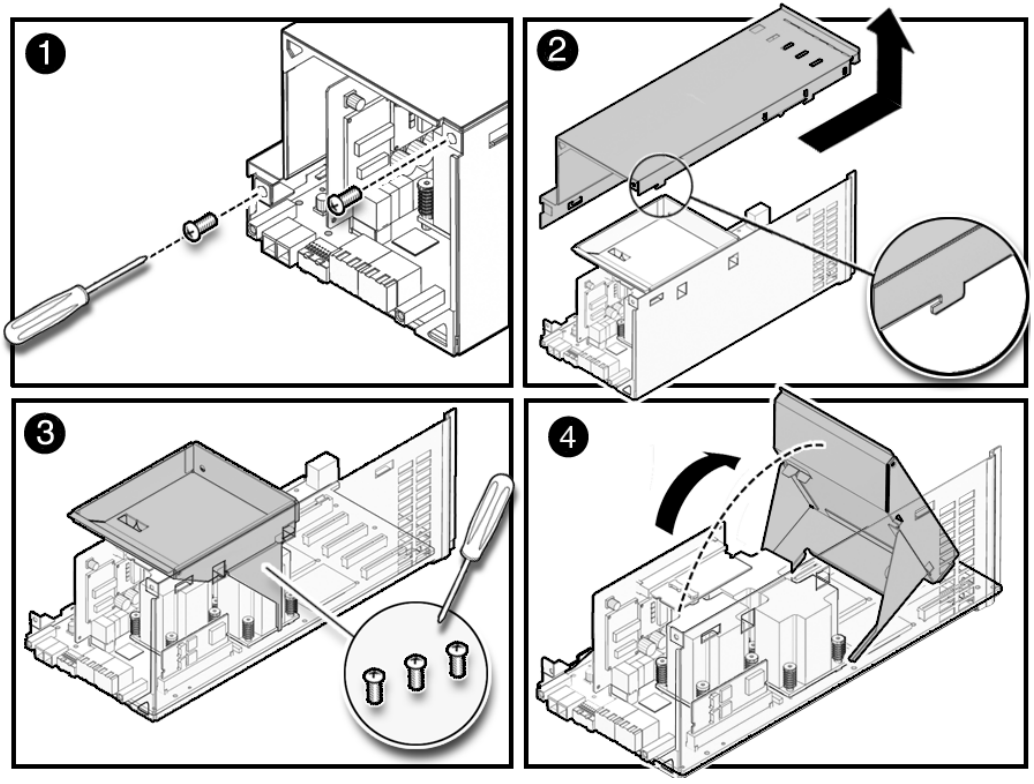
2. **Remove the I/O unit.**

   This step includes disconnecting and labelling the cables connecting to the PCI cassettes, removing the cassettes, removing the cable management arm, and finally removing the I/O unit. See "Removing the I/O Unit" on page 8-10.

8.4.2 Removing the I/O Unit DC-DC Converter (DDC_A #0 or DDC_B #0)

1. **Loosen the two screws at the front of the I/O unit using a No. 2 screwdriver (**FIGURE 8-9**).**
2. **Push the I/O unit cover slightly forward and then pull the front of the cover up to remove the cover from the I/O unit.**

FIGURE 8-9 Exposing the I/O Unit DC-DC Converter (Without a DC-DC Converter Retainer)



3. **Loosen the three screws that hold the metal bracket in place and tilt the bracket towards the front of the I/O unit to expose the inside of the I/O unit.**

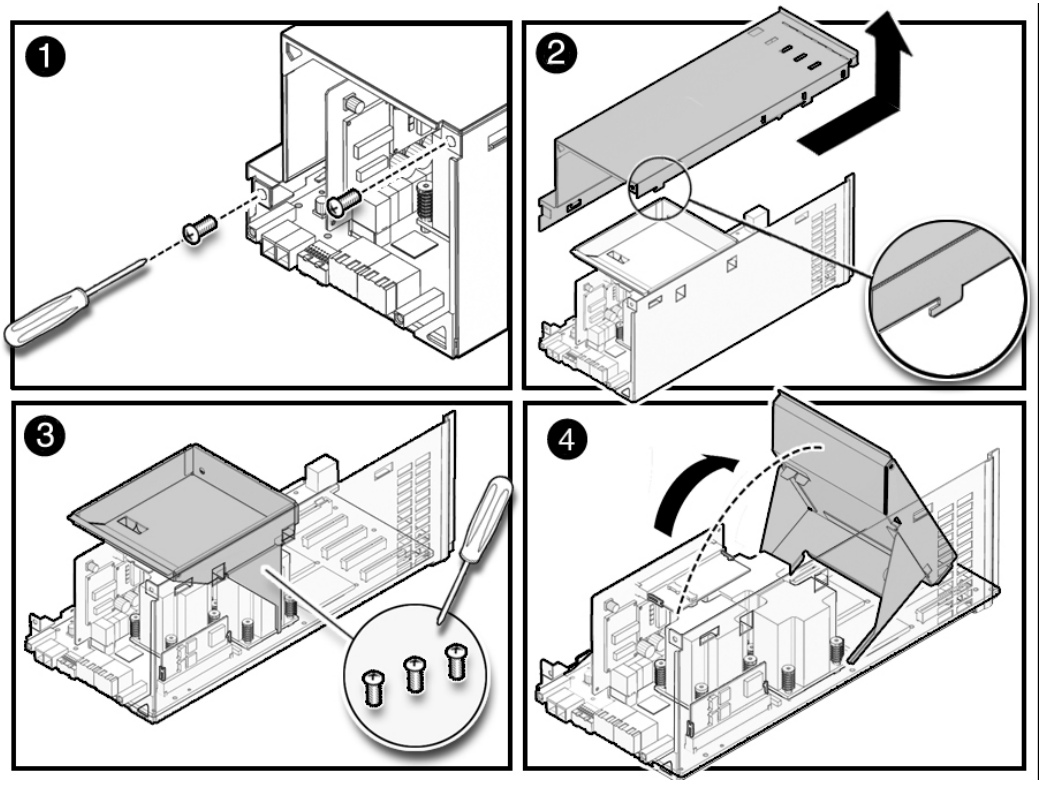
   A small cable is passed through a hole in the bracket. Disconnect the cable and pass it through the hole in the bracket before moving the bracket to prevent damage to the cable. It is not necessary to remove the entire bracket.

Determine if your server currently has a label installed on the I/O unit DC-DC converter (DDC_B#0).

- If your server does *not* have a label covering part of the I/O unit DC-DC converter and has no DC-DC converter retainer, go to Step 4 (FIGURE 8-9).
- If your server *does* have a label covering part of the I/O unit DC-DC converter, start from one corner of the label and peel the label free of the I/O unit DC-DC converter. The label can be re-used on the replacement I/O unit DC-DC converter.

- If your server does *not* have a label covering part of the I/O unit DC-DC converter and has the DC-DC converter retainer, go to Step 4 (FIGURE 8-10).

FIGURE 8-10 Exposing the I/O Unit DC-DC Converter (With a DC-DC Converter Retainer)



4. **Remove the DC-DC converter from the slot.**
   - If the DC-DC converter is seated in the slot on the DC-DC converter riser or directly on the I/O unit, perform the following steps:

     a. **Gently pull the DC-DC converter from the slot.**

     b. **Place the DC-DC converter on the ESD mat.**

   - If the DC-DC converter is seated in a DC-DC converter retainer, perform the following steps:

     a. **Grasp the DC-DC converter retainer with one hand. With the other hand, gently pull away the retention clip of the DC-DC converter retainer from one notch on the DC-DC converter.**

Note – Do not pull the retention clips of the DC-DC converter retainer too far out when disengaging the DC-DC converter. This might cause the DC-DC converter retainer retention clips to deform and prevent proper seating of the DC-DC converter.

b. **G**ently pull the DC-DC converter from the slot.

c. **Place** the DC-DC converter **on the ESD mat.**

8.4.3 Installing the I/O Unit DC-DC Converter (DDC_A #0 or DDC_B #0)

Caution – The DC-DC converter (DDC_B#0) that goes in the slot on the DC-DC Converter Riser has a metal heat sink. The DC-DC converter (DDC_A#0) that goes in the slot on the I/O board does not. If these converters are installed in the wrong slots, serious damage to the I/O unit will result.

Determine if your server currently has a label installed on the I/O unit DC-DC converter (DDC_B#0).

FIGURE 8-11 DC-DC Converter (DDC_B#0) Label

- If your server does *not* have a label covering part of the I/O unit DC-DC converter and has no DC-DC converter retainer, go to Step 1 (FIGURE 8-12).

- If your server *does* have a label covering part of the I/O unit DC-DC converter, start from one corner of the label and peel the label free of the I/O unit DC-DC converter. The label can be re-used on the replacement I/O unit DC-DC converter.
- If your server does *not* have a label covering part of the I/O unit DC-DC converter and has the DC-DC converter retainer, go to Step 1 (FIGURE 8-13).

1. **Disengage the old DC-DC converter from the slot.**
2. **Insert the new DC-DC converter in the slot (FIGURE 8-12).**
   - If the DC-DC converter will be seated in the slot on the DC-DC converter riser or directly on the I/O unit, push gently downward to seat the DC-DC converter.
   - If the DC-DC converter will be seated in a DC-DC converter retainer, perform the following steps:

   a. **Grasp the DC-DC converter retainer with one hand. With the other hand, gently pull away the retention clip of the DC-DC converter retainer to slightly widen the slot entrance for the DC-DC converter.**

Note – Do not pull the retention clips of the DC-DC converter retainer too far out when preparing to insert the DC-DC converter. This might cause the DC-DC converter retainer retention clips to deform and prevent proper seating of the DC-DC converter.

---

   b. **Insert the DC-DC converter in the DC-DC converter retainer.**

3. **Push gently downward to seat the DC-DC converter.**

   Ensure that the DC-DC converter is firmly seated in the slot and both notches on sides of the DC-DC converter are secure in the retention clips of the retainer.

FIGURE 8-12 Installing the DC-DC Converter (Without a DC-DC Converter Retainer)

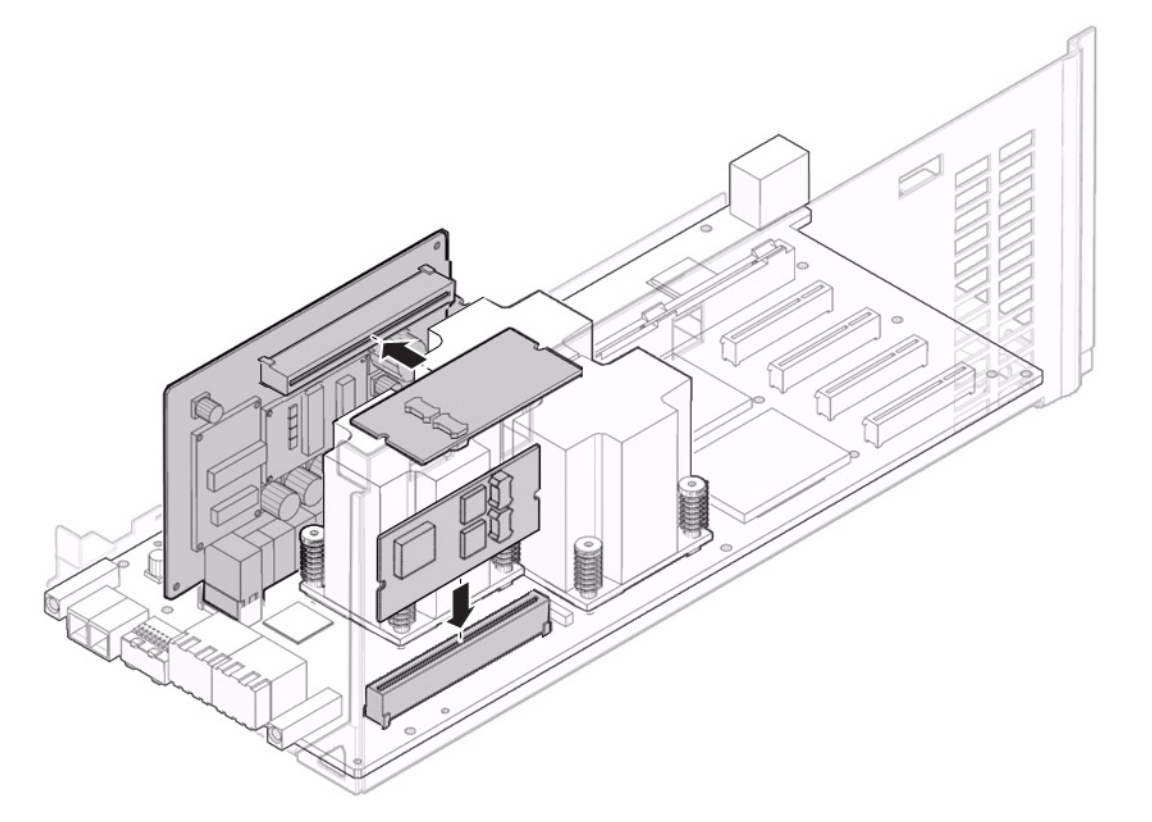
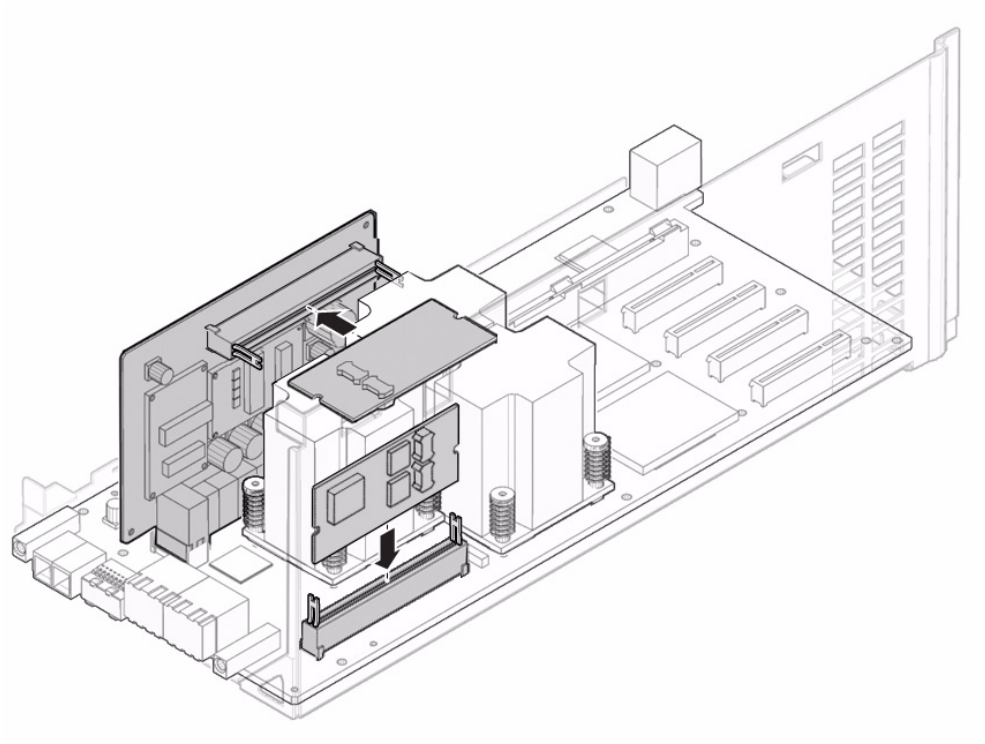


FIGURE 8-13 Installing the DC-DC Converter (With a DC-DC Converter Retainer)



4. **Place the metal bracket into position and tighten the three screws that hold the metal bracket in place.**

   Reconnect the small cable before tightening the screws to the bracket.

5. **Install the I/O unit cover.**

6. **Tighten the two screws at the front of the I/O unit using a No. 2 screwdriver.**

8.4.4 Securing the Server

1. **Install the I/O unit.**

   This step includes installing the I/O unit, restoring the cable management arm, installing the cassettes and connecting the cables to the correct cards. See "Installing the I/O Unit" on page 8-11.

2. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

3. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

8.4.5 Accessing the I/O Unit DC-DC Converter Riser

Caution – There is an electrical hazard if the power cords are not disconnected.All power cords must be disconnected to completely remove power from the server.

---

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

---

2. **Remove the I/O unit.**

   This step includes disconnecting and labelling the cables connecting to the PCI cassettes, removing the cassettes, removing the cable management arm, and finally removing the I/O unit. See "Removing the I/O Unit" on page 8-10.

8.4.6 Removing the I/O Unit DC-DC Converter Riser

1. **Loosen the two screws at the front of the I/O unit using a No. 2 screwdriver (FIGURE 8-14).**
2. **Push the I/O unit cover slightly forward and then pull the front of the cover up to remove the cover from the I/O unit.**
3. **Loosen the three screws that hold the metal bracket in place and tilt the bracket towards the front of the I/O unit to expose the inside of the I/O unit.**

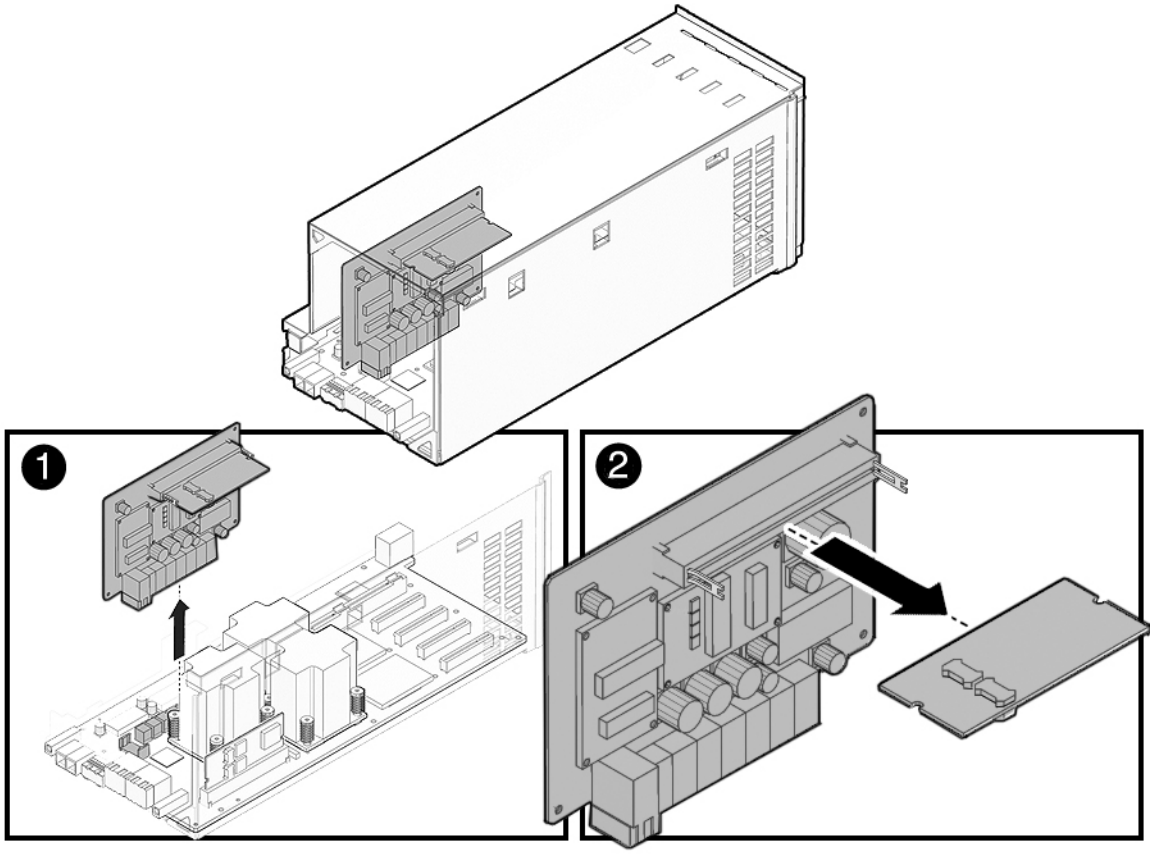
   The bracket has a circuit board and cable connected to it. It is not necessary to remove the entire bracket.
4. **Pull the DC-DC converter riser from the socket (FIGURE 8-14).**

Determine if your server currently has a label installed on the I/O unit DC-DC converter (DDC_B#0).

- If your server does *not* have a label covering part of the I/O unit DC-DC converter, go to Step 5.
- If your server *does* have a label covering part of the I/O unit DC-DC converter, start from one corner of the label and peel the label free of the I/O unit DC-DC converter.

5. **Disengage the DC-DC converter from the slot in the DC-DC converter riser or DC-DC converter retainer and place them both on the ESD mat.**

FIGURE 8-14 Removing the I/O Unit DC-DC Converter Riser and DC-DC Converter (DDC_B#0)



8.4.7 Replacing the I/O Unit DC-DC Converter Riser

Caution – The DC-DC converter (DDC_B#0) that goes in the slot on the DC-DC Converter Riser has a metal heat sink. The DC-DC converter (DDC_A#0) that goes in the slot on the I/O board does not. If these converters are installed in the wrong slots, serious damage to the I/O unit will result.

1. **Replace the DC-DC converter (DDC_B#0) onto the DC-DC converter riser. See** Section 8.4.3, "Installing the I/O Unit DC-DC Converter (DDC_A #0 or DDC_B #0)" on page 8-17**.**
2. **Push gently downward to seat the DC-DC converter riser in the socket in the I/O unit.**
3. **Rethread the small cable back through the hole in the bracket**
4. **Place the metal bracket into position and tighten the three screws that hold the metal bracket in place.**

   Reconnect the small cable before tightening the screws to the bracket.
5. **Install the I/O unit cover.**
6. **Tighten the two screws at the front of the I/O unit using a No. 2 screwdriver.**

8.4.8 Securing the Server

1. **Install the I/O unit.**

   This step includes installing the I/O unit, restoring the cable management arm, installing the cassettes and connecting the cables to the correct cards. See "Installing the I/O Unit" on page 8-11.
2. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

3. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

CHAPTER 9

XSCF Unit Replacement

The eXtended System Control facility unit (XSCFU or XSCF unit) is also known as the service processor. The unit operates with an independent processor and directs startup, reconfiguration, and fault diagnosis and provides access to the domains. This chapter provides an overview of the unit and describes how to remove and replace it. This information is organized into the following topic:

- "XSCF Unit Replacement" on page 9-1

9.1 XSCF Unit Replacement

The XSCF unit is a cold replacement component. This means the entire server must be powered off and the power cords disconnected to replace the XSCF unit.

Note – If you replace the XSCF unit and the operator panel simultaneously, system will not operate normally. Execute the `showhardconf` command or the `showstatus` command to confirm that the component replaced earlier is operating normally, before replacing the subsequent FRU.

FIGURE 9-1 shows the XSCF unit location on the SPARC Enterprise M4000 server.

FIGURE 9-1 SPARC Enterprise M4000 XSCF Unit Location (Rear)

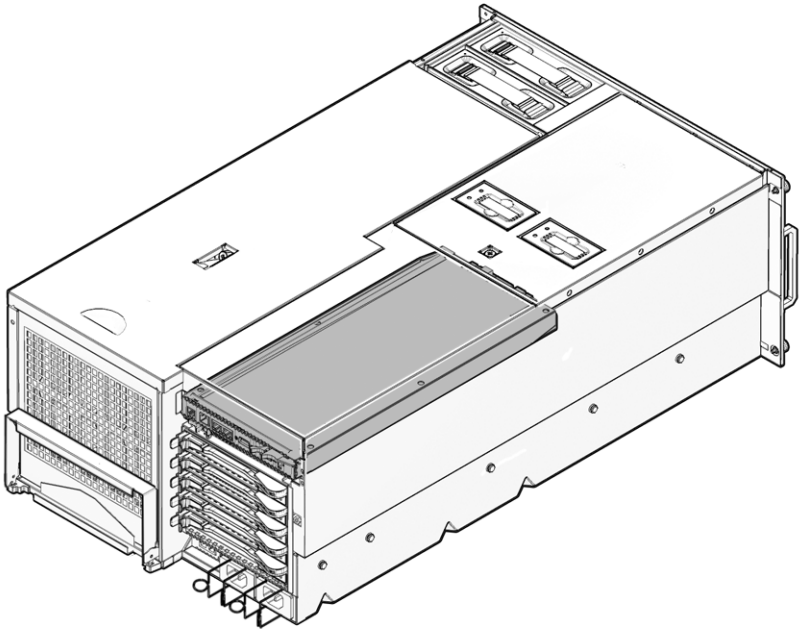
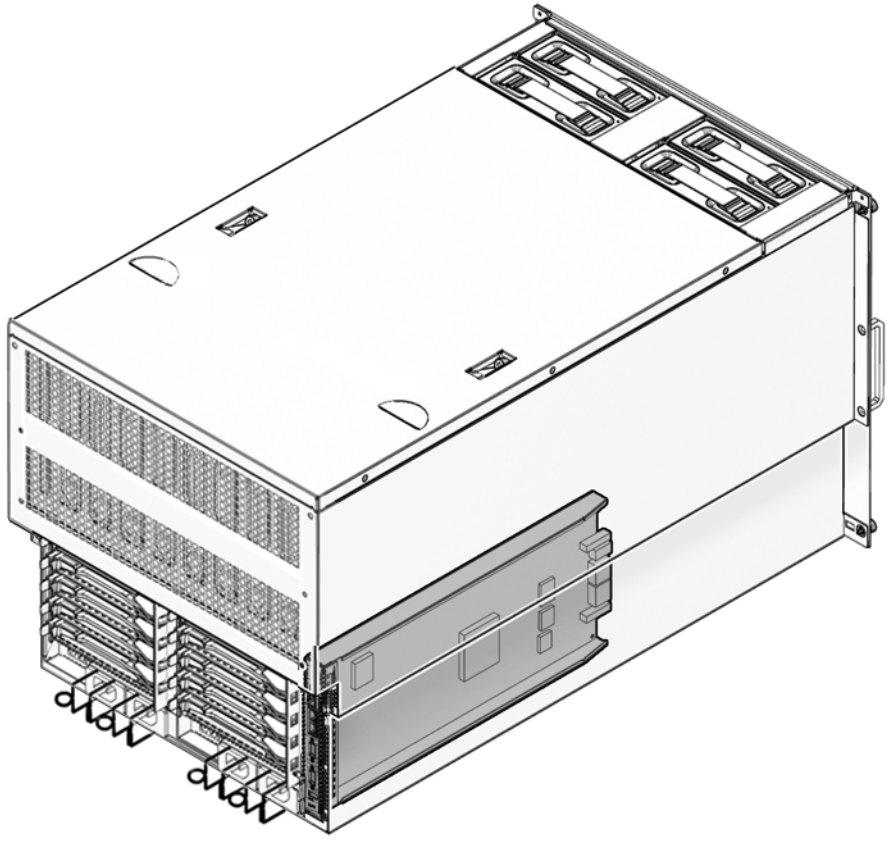


FIGURE 9-2 shows the XSCF unit location on the SPARC Enterprise M5000 server.

FIGURE 9-2 SPARC Enterprise M5000 XSCF Unit Location (Rear)



9.1.1 Accessing the XSCF Unit

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

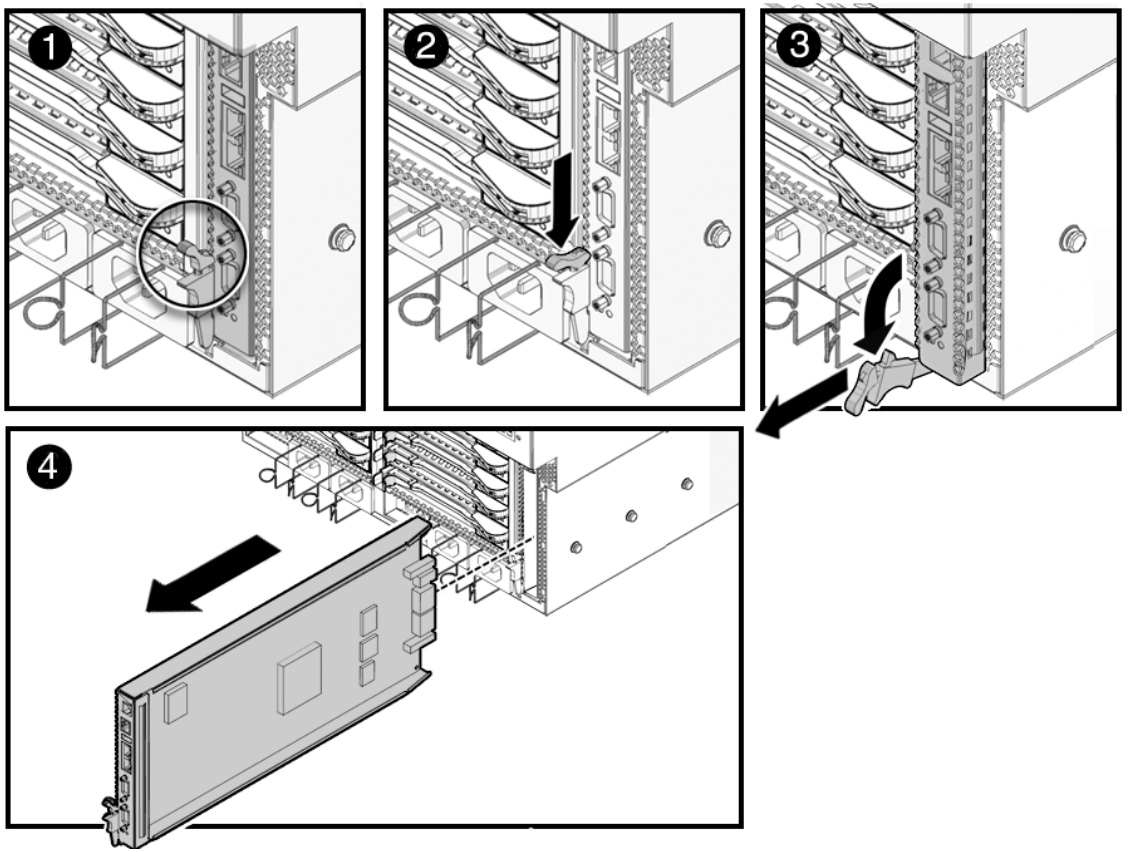
2. **Label and remove the Ethernet and UPC cables connecting to the XSCFU.**

9.1.2 Removing the XSCF Unit

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Pinch the handle and then pull the lever on the XSCF unit downward to unseat the board (FIGURE 9-3).**
2. **Remove the board from the slot and place it on the ESD mat.**

FIGURE 9-3 XSCF Unit Removal



9.1.3 Installing the XSCF Unit

Caution – *Do not force* the XSCF unit into a slot. Doing so can cause damage to the XSCF unit and server.

1. **Place the XSCF unit on the lip and gently slide it into the slot.**

   Use the lever as a handle to avoid touching the circuits.

2. **Lock the lever into place to seat the board.**

3. **Connect the ethernet and UPC cables to the XSCFU.**

9.1.4 Securing the Server

1. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If automatic booting is configured, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the ok prompt.

2. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

Note – The version of the firmware on the replaced XSCF unit might be different from the version on the original. When replacing the XSCF unit, the operator will be presented with installation options on firmware. To check the version and update the firmware, refer to the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

3. **Reset the clock.**

   See the *SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for more detailed information on setting the system clock.

CHAPTER 10

Fan Modules Replacement

The fan units move air currents into and out of the server. This chapter describes how to remove and install the fan units. The information is organized into the following topic:

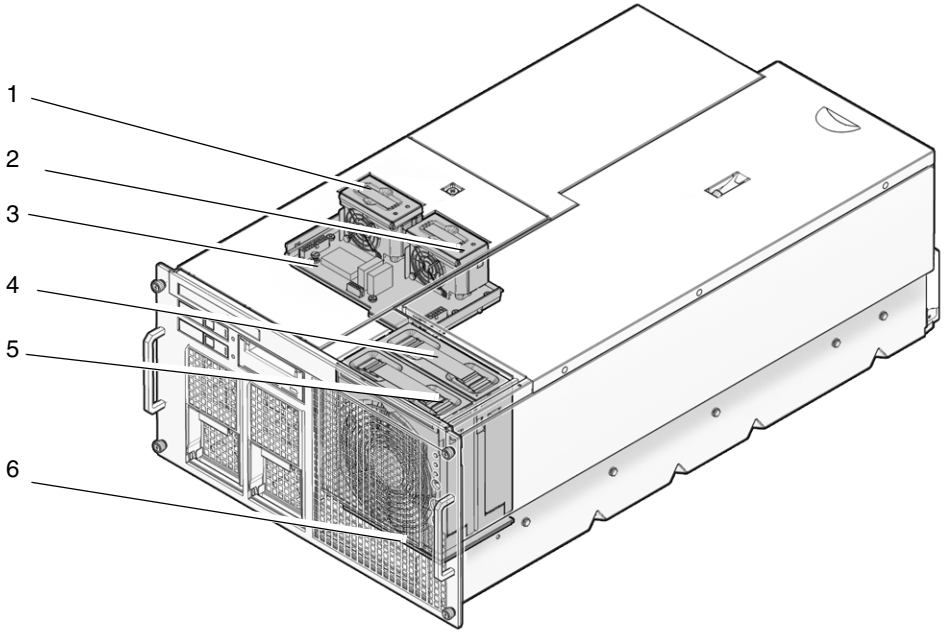
- "Fan Module Replacement" on page 10-1

10.1 Fan Module Replacement

The 172-mm fan module is the primary cooling system. The 172-mm fan module is in both midrange servers. The 60-mm fan module is for additional cooling in the SPARC Enterprise M4000 server. The fan modules are hot, active, or cold replacement components. When using active replacement, only one fan module should be replaced at a time to ensure redundancy. The fan backplanes are cold replacement components.

FIGURE 10-1 shows the fan module and fan backplane location on the SPARC Enterprise M4000 server.

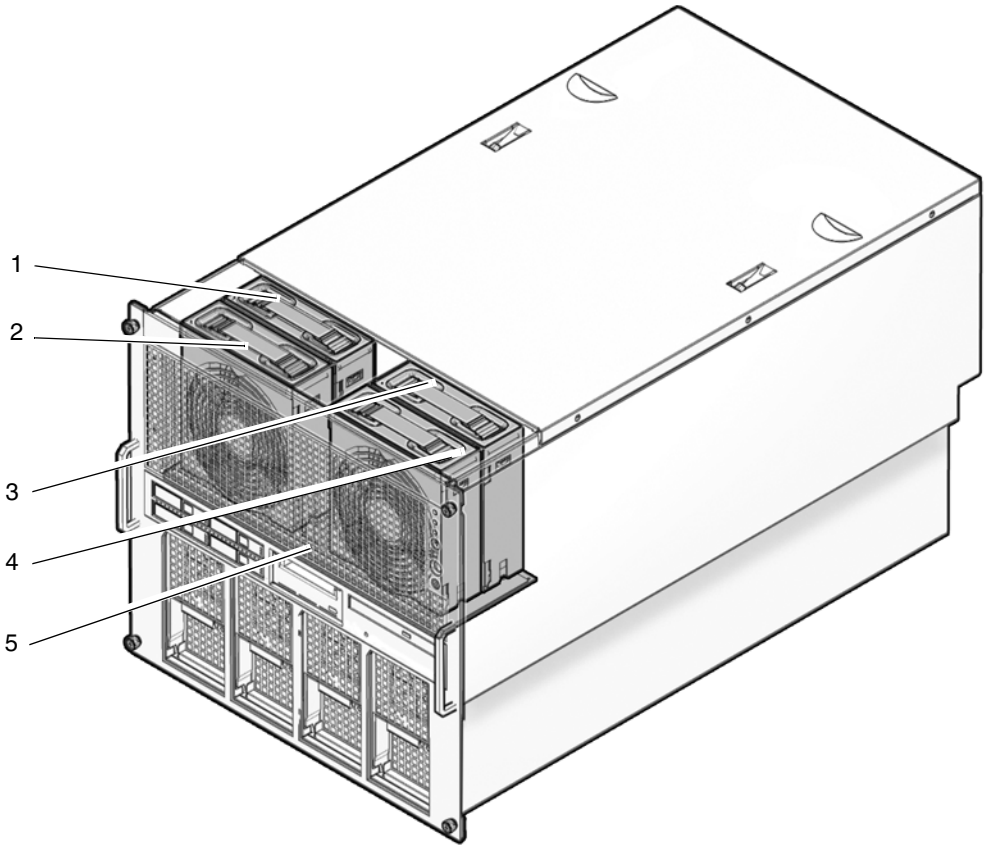
FIGURE 10-1 SPARC Enterprise M4000 Fan Module and Fan Backplane Locations



Location Number	Component
1	60-mm fan module (FAN_B#0)
2	60-mm fan module (FAN_B#1)
3	60-mm fan backplane (FANBP_B)
4	172-mm fan module (FAN_A#1)
5	172-mm fan module (FAN_A#0)
6	172-mm fan backplane (FANBP_A)

FIGURE 10-2 shows the fan module and fan backplane location on the SPARC Enterprise M5000 server.

FIGURE 10-2 SPARC Enterprise M5000 Fan Module and Fan Backplane Locations



Location Number	Component
1	172-mm fan module (FAN_A#1)
2	172-mm fan module (FAN_A#0)
3	172-mm fan module (FAN_A#3)
4	172-mm fan module (FAN_A#2)
5	172-mm fan backplane (FANBP_C)

10.1.1 Accessing the 60-mm Fan Module

1. **From the XSCF Shell prompt, use the `replacefru` command to disable the fan to be removed.**

```
XSCF> replacefru
```

The `replacefru` command is menu-driven. `replacefru` will continue while the fan is removed and *then test the fan.* Refer to "Removing and Replacing a FRU" on page 4-7 for more information.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Caution – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Deploy the rack's antitilt features (if applicable) and slide the server out of the equipment rack.**

   See "Sliding the Server Out of the Equipment Rack" on page 5-2.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

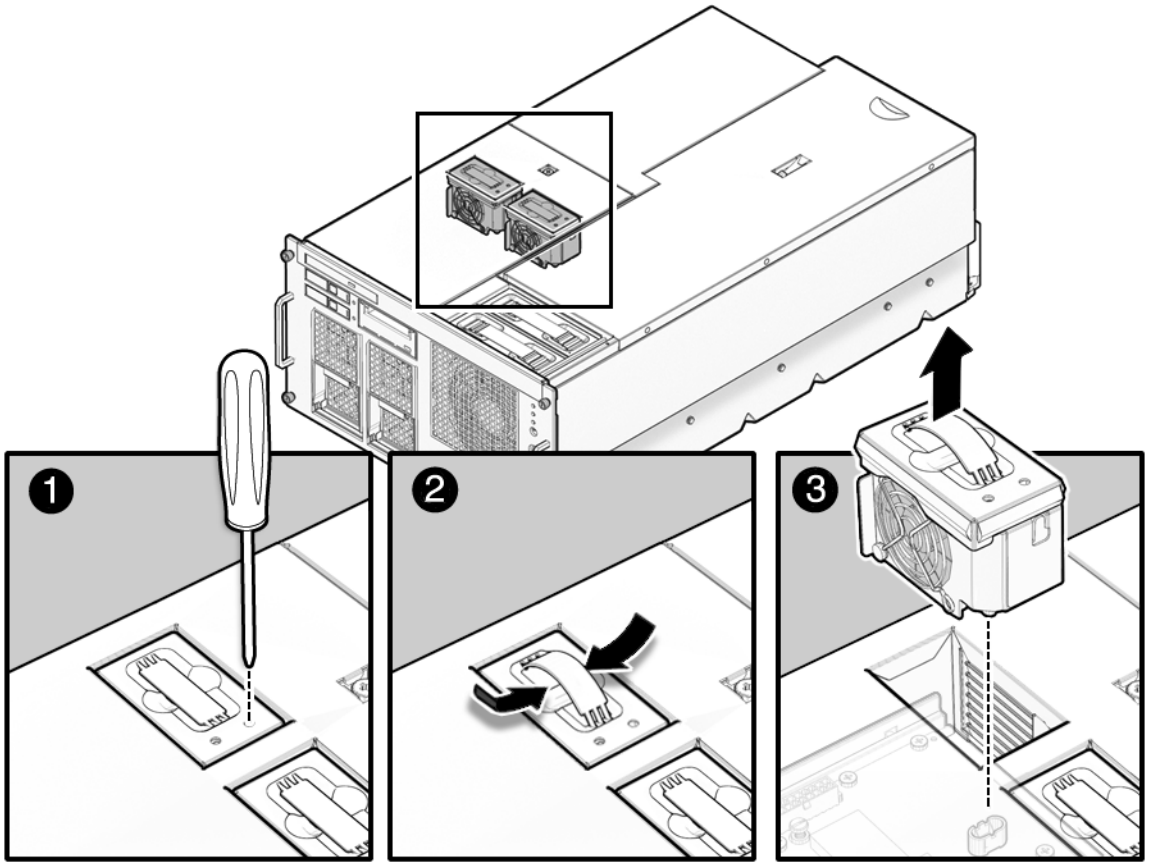
10.1.2 Removing the 60-mm Fan Module

1. **Place a No. 1 screwdriver into the fan release hole and pull upwards on the handle to unseat the fan (FIGURE 10-3).**

   The screwdriver must be pushed down until it stops to release the fan lock.

2. **Remove the 60-mm fan module from the server and place the fan on an ESD mat.**

FIGURE 10-3 60-mm Fan Module Removal



10.1.3 Installing the 60-mm Fan Module

Caution – *Do not force* the fan into the slot. Doing so can cause damage to the fan and server.

1. **Align the fan module (LED on left) and slide the fan into the slot.**

   A fan module placed backwards into the slot will stop halfway to prevent damage to the connectors. If the fan does not slide in easily, remove it, and rotate the fan 180 degrees and then try again.

2. **Push down with two fingers to seat the fan module.**

10.1.4 Securing the Server

- **Slide the server into the equipment rack and secure the stabilizer bar.**

  See "Sliding the Server Into the Equipment Rack" on page 5-4.

10.1.5 Accessing the 172-mm Fan Module

1. **From the XSCF Shell prompt, use the `replacefru` command to disable the fan to be removed.**

```
XSCF> replacefru
```

The `replacefru` command is menu-driven. `replacefru` will continue while the fan is removed and then test the fan. Refer to "Removing and Replacing a FRU" on page 4-7 for more information.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Deploy the rack's antitilt features (if applicable) and slide the server out of the equipment rack.**

   See "Sliding the Server Out of the Equipment Rack" on page 5-2.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

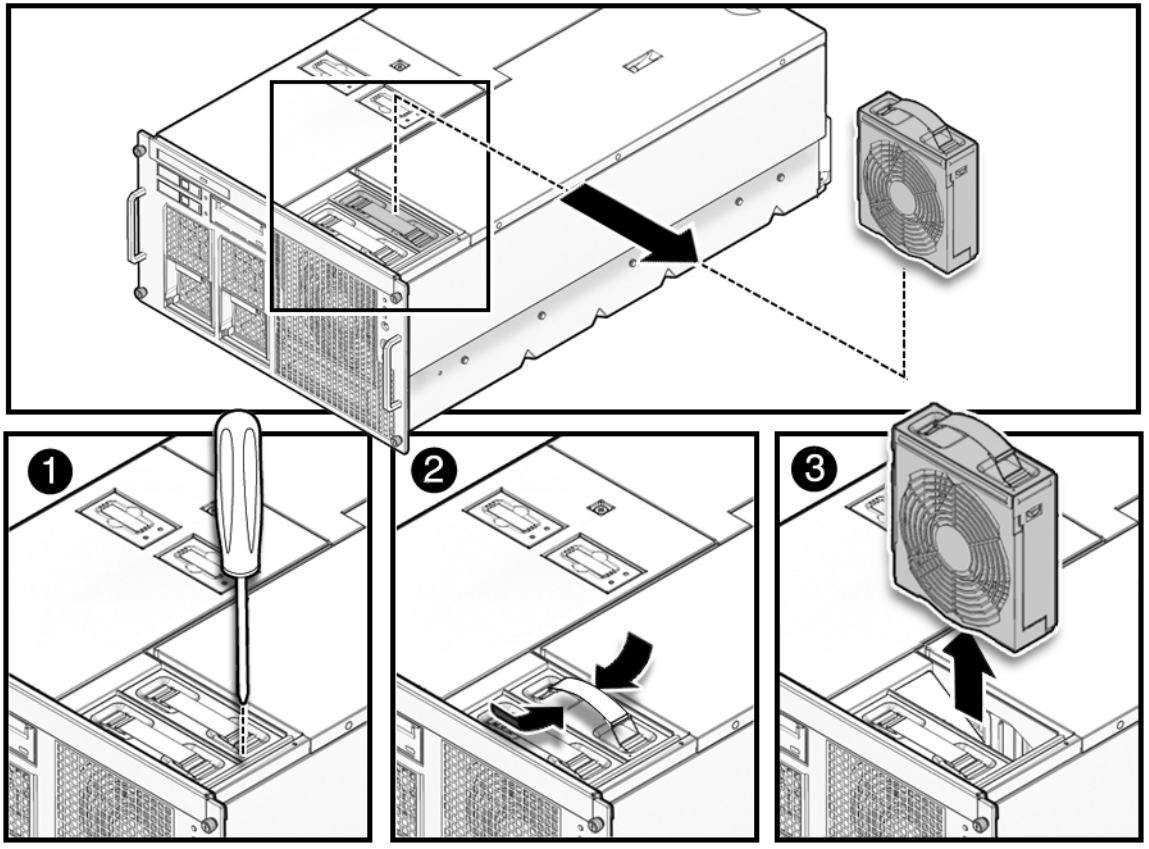
10.1.6 Removing the 172-mm Fan Module

1. **Place a No. 1 screwdriver into the fan module release hole and pull upwards on the handle to unseat the fan (**FIGURE 10-4**).**

   The screwdriver must be pushed down until it stops to release the fan lock.

2. **Remove the fan module from the server and place it on an ESD mat.**

FIGURE 10-4 172-mm Fan Module Removal



10.1.7 Installing the 172-mm Fan Module

Caution – *Do not force* the fan module into the slot. Doing so can cause damage to the fan module and server.

1. **Align the fan module (LED on left) and slide the fan into the slot.**

   A fan module placed backwards into the slot will stop halfway to prevent damage to the connectors. If the fan does not slide in easily, remove it, and rotate the fan 180 degrees and then try again.

2. **Push down with two fingers to seat the fan module.**

10.1.8 Securing the Server

- **Slide the server into the equipment rack and secure the stabilizer bar.**

  See "Sliding the Server Into the Equipment Rack" on page 5-4.

10.1.9 Accessing the 60-mm Fan Backplane

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the fan cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, removing the 60-mm fan units, and removing the fan cover. See "Removing the Fan Cover" on page 5-8.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

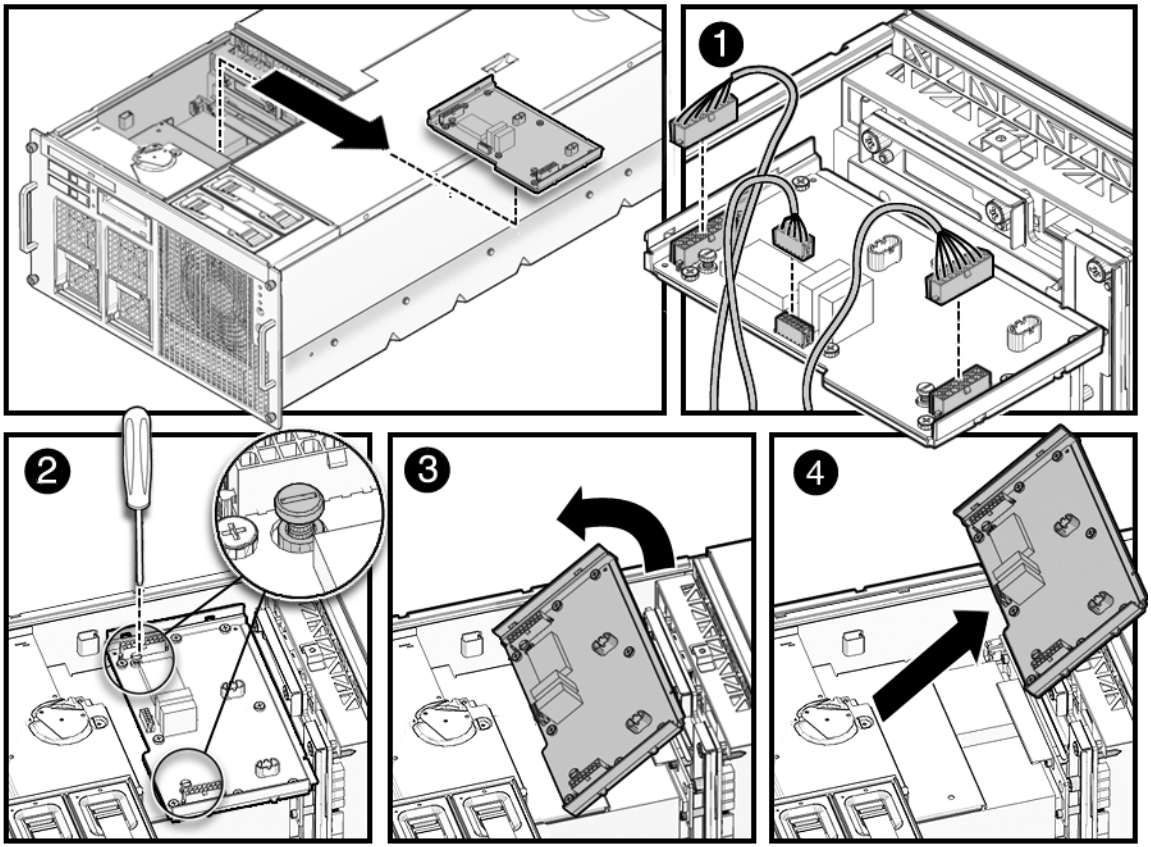
3. **Remove the CD-RW/DVD-RW drive backplane.**

   This step includes removing the CD-RW/DVD-RW Drive Unit and the CD-RW/DVD-RW drive backplane. See "Removing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-17.

10.1.10 Removing the 60-mm Fan Backplane

1. **Observe how the cable bundle routes beneath the left front edge of the 60-mm fan backplane. This routing must be duplicated when the backplane unit is reinstalled.**
2. **Remove the three (3) cable connectors on the forward edge of the 60-mm fan backplane (**FIGURE 10-5 **#1).**
3. **Loosen the two (2) green captive screws (**FIGURE 10-5 **#2).**
4. **Remove the 60-mm fan backplane from the server and place it on the ESD mat (**FIGURE 10-5 **#3 and #4) .**

FIGURE 10-5 Removing the 60-mm Fan Backplane



10.1.11 Installing the 60-mm Fan Backplane

1. **Put the 60-mm fan backplane into place.**

   Be certain the cables are routed beneath the backplane so that the backplane is level and no cables are pinched.

2. **Tighten the two (2) green captive screws.**

3. **Connect the three cables to the forward edge of the fan backplane.**

10.1.12 Securing the Server

1. **Install the CD-RW/DVD-RW Drive backplane.**

   This step includes installing the CD-RW/DVD-RW Drive Backplane and the CD-RW/DVD-RW Drive Unit. See "Installing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-18.

2. **Install the fan cover.**

   This step includes replacing the fan cover, installing the 60-mm fan units, sliding the server in to the equipment rack and restoring the rack antitilt features to their original position. See "Replacing the Fan Cover" on page 5-10.

3. **Power the server on.**

   This step includes reconnecting power cables, verifying the state of the LEDs and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

4. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

10.1.13 Accessing the SPARC Enterprise M4000 172-mm Fan Backplane

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Deploy the rack's antitilt features (if applicable) and slide the server out of the equipment rack.**

   See "Sliding the Server Out of the Equipment Rack" on page 5-2.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

10.1.14 Removing the SPARC Enterprise M4000 172-mm Fan Backplane

1. **Remove the 172-mm fan units and place them on an ESD mat.**

   See "Removing the 172-mm Fan Module" on page 10-8.

2. **Loosen the two (2) captive screws and remove the fan cage.**

   The fan cage previously held the 172-mm fan units in place.

3. **Loosen the remaining captive screw that secures the 172-mm fan backplane.**

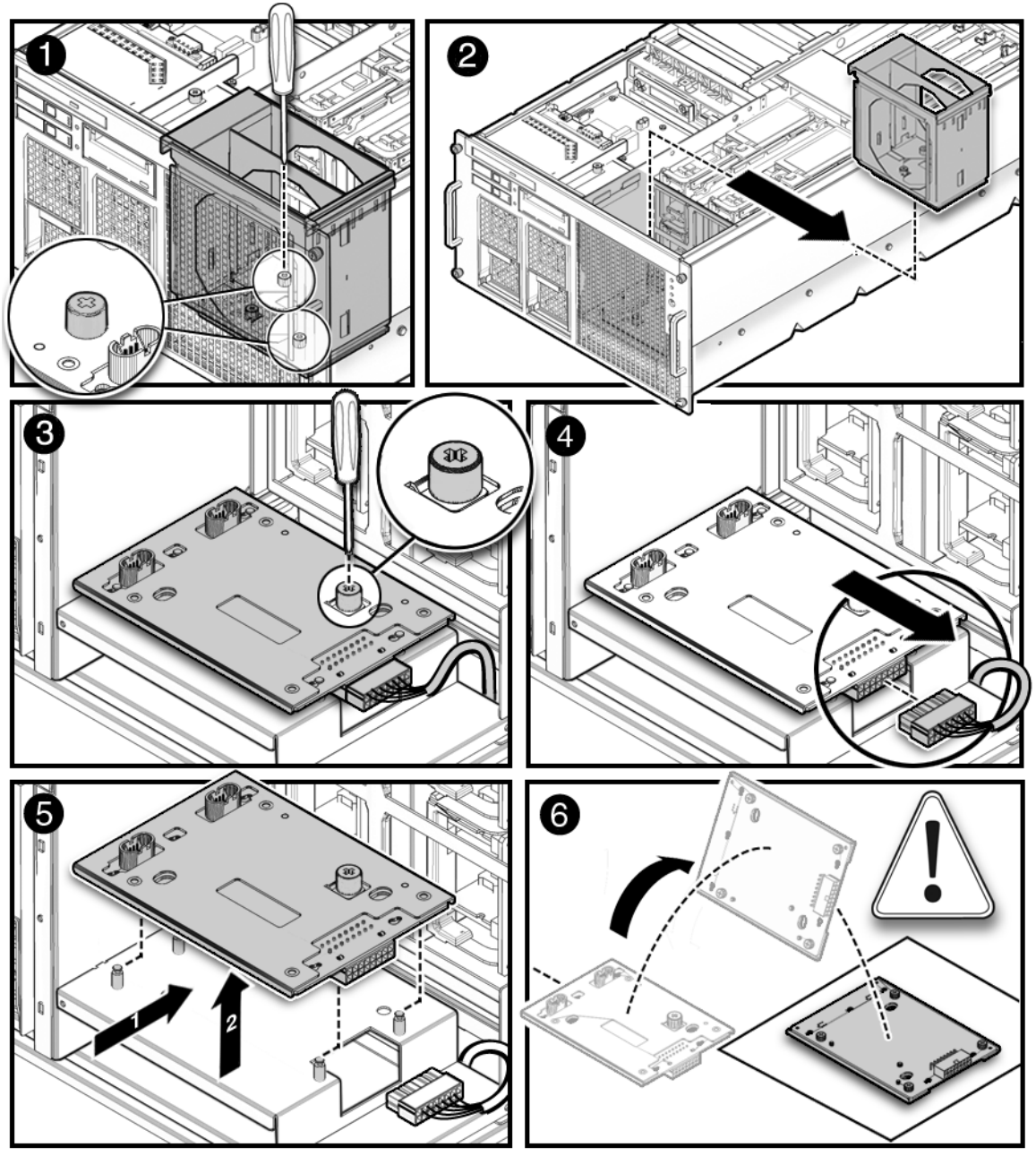
4. **Disconnect the cable from the 172-mm fan backplane.**

5. **Slide the 172-mm fan backplane towards the interior of the server and then upwards to remove the 172-mm fan backplane.**

6. **Place the 172-mm fan backplane *upside down* on the ESD mat.**

   This must be placed upside down to protect the circuits on the underside.

FIGURE 10-6 Removing the SPARC Enterprise M4000 172-mm Fan Backplane



10.1.15 Installing the SPARC Enterprise M4000 172-mm Fan Backplane

1. **Slide the 172-mm fan backplane downwards towards the interior of the server and then pull it forward into place.**
2. **Connect the cable to the 172-mm fan backplane.**
3. **Tighten the captive screw that secures the 172-mm fan backplane.**
4. **Install the fan cage and tighten the two (2) captive screws that secure it in place.**
5. **Install the 172-mm fan units.**

   See "Installing the 172-mm Fan Module" on page 10-9.

10.1.16 Securing the Server

1. **Slide the server into the equipment rack and secure the stabilizer bar.**

   See "Sliding the Server Into the Equipment Rack" on page 5-4.

2. **Power on the server.**

   This step includes reconnecting power cables, verifying the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

3. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

10.1.17 Accessing the SPARC Enterprise M5000 172-mm Fan Backplane

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Deploy the rack's antitilt features (if applicable) and slide the server out of the equipment rack.**

   See "Sliding the Server Out of the Equipment Rack" on page 5-2.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

10.1.18 Removing the SPARC Enterprise M5000 172-mm Fan Backplane

1. **Remove the 172-mm fan units and place them on an ESD mat.**

   See "Removing the 172-mm Fan Module" on page 10-8.

2. **Loosen the three (3) captive screws and remove the fan cage.**

   The fan cage previously held the 172-mm fan units in place.

3. **Loosen the remaining captive screw that secures the 172-mm fan backplane.**

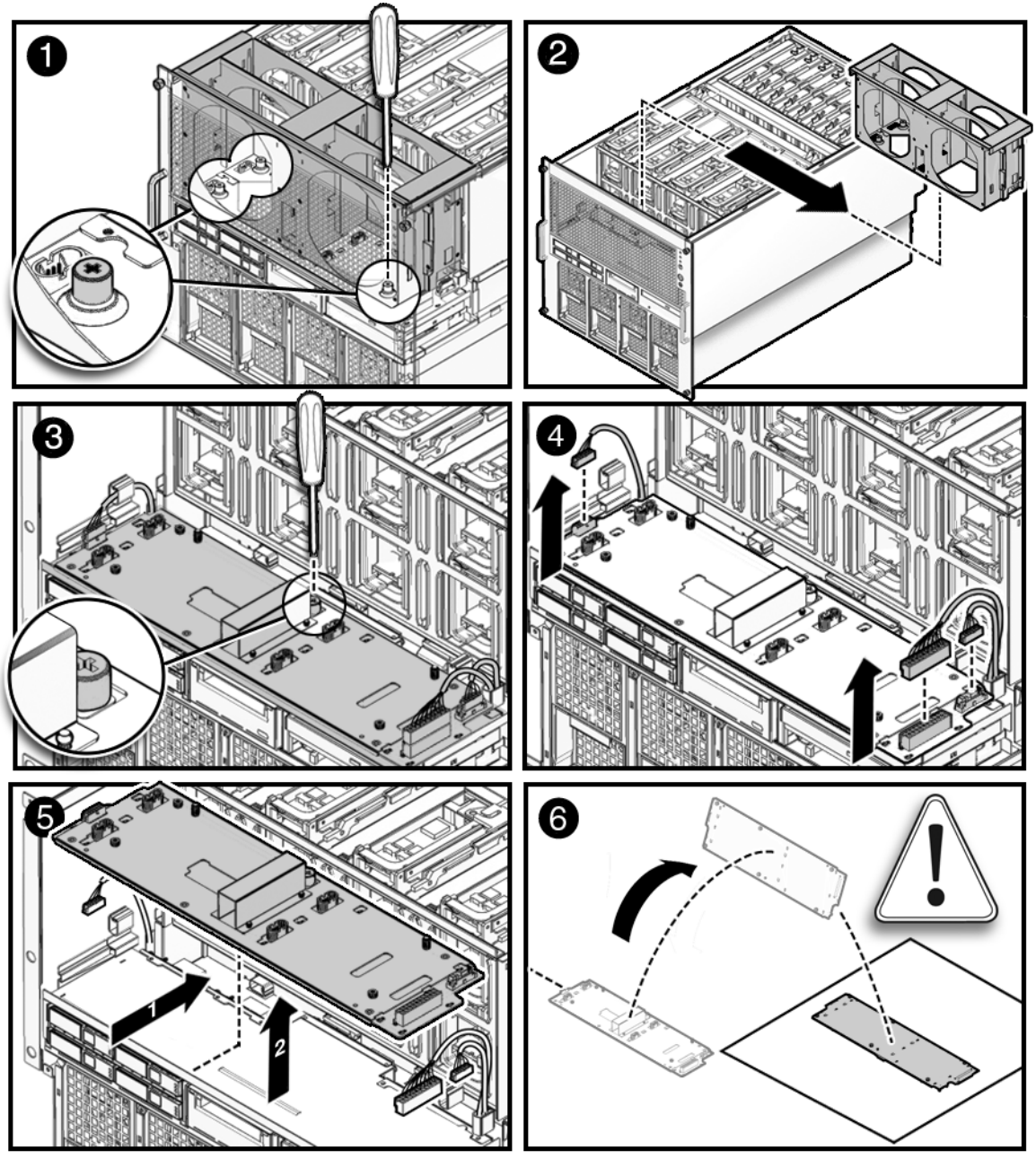
4. **Disconnect the three (3) cables from the 172-mm fan backplane.**

5. **Slide the 172-mm fan backplane towards the interior of the server and then upwards to remove the 172-mm fan backplane.**

6. **Place the 172-mm fan backplane *upside down* on the ESD mat.**

   This must be placed upside down to protect the circuits on the underside.

FIGURE 10-7 Removing the SPARC Enterprise M5000 172-mm Fan Backplane



10.1.19 Installing the SPARC Enterprise M5000 172-mm Fan Backplane

1. **Slide the 172-mm fan backplane downwards towards the interior of the server and then pull it forward into place.**
2. **Connect the three (3) cables to the 172-mm fan backplane.**
3. **Tighten the captive screw that secures the 172-mm fan backplane.**
4. **Install the fan cage and tighten the three (3) captive screws that secure it in place.**
5. **Install the 172-mm fan units.**

   See "Installing the 172-mm Fan Module" on page 10-9.

10.1.20 Securing the Server

1. **Slide the server into the equipment rack and secure the stabilizer bar.**

   See "Sliding the Server Into the Equipment Rack" on page 5-4.

2. **Power on the server.**

   This step includes reconnecting power cables, verifying the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

3. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

CHAPTER 11

Memory Board Replacement

The memory boards contain system memory DIMMs. This chapter describes how to remove and replace memory boards and DIMMs. The information is organized into the following topics:

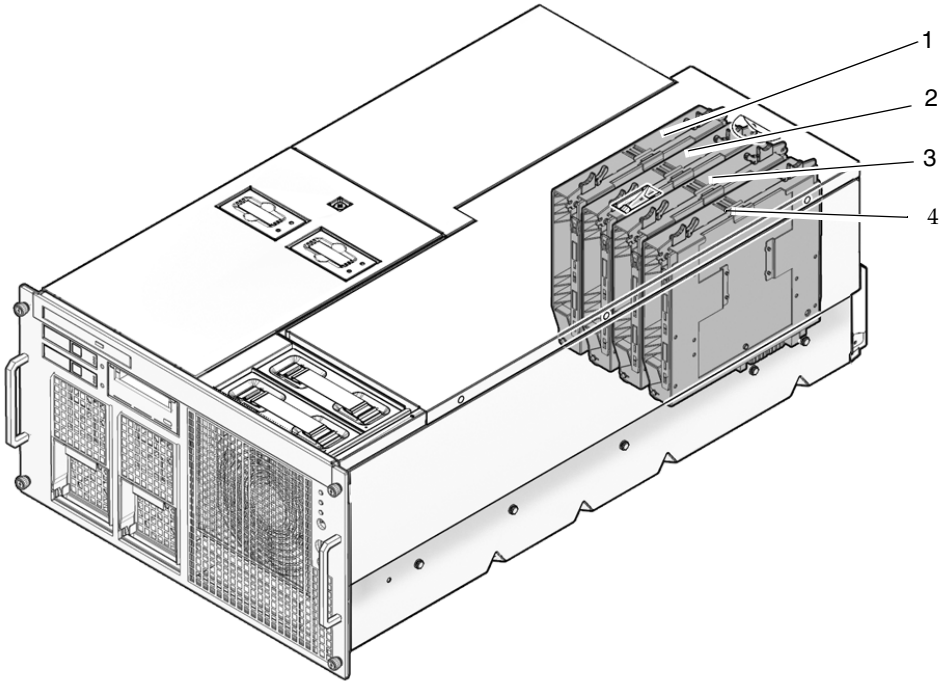
- "Memory Board Replacement" on page 11-1
- "DIMM Replacement" on page 11-8

11.1 Memory Board Replacement

The memory boards are cold replacement components. The entire server must be powered off and the power cords disconnected to replace the memory boards.

FIGURE 11-1 shows the memory board location on the SPARC Enterprise M4000 server.

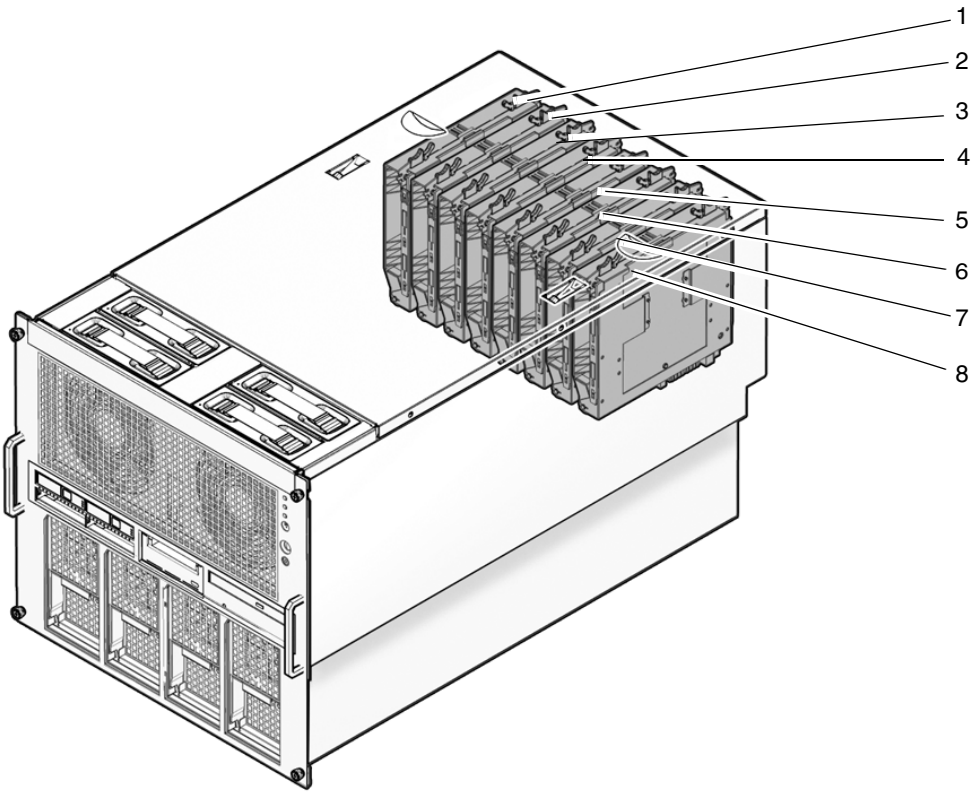
FIGURE 11-1 SPARC Enterprise M4000 Memory Board Locations



Location Number	Component
1	Memory board (MEMB#0)
2	Memory board (MEMB#1)
3	Memory board (MEMB#2)
4	Memory board (MEMB#3)

FIGURE 11-2 shows the memory board location on the SPARC Enterprise M5000 server.

FIGURE 11-2 SPARC Enterprise M5000 Memory Board Locations



Location Number	Component
1	Memory board (MEMB#0)
2	Memory board (MEMB#1)
3	Memory board (MEMB#2)
4	Memory board (MEMB#3)
5	Memory board (MEMB#4)
6	Memory board (MEMB#5)
7	Memory board (MEMB#6)
8	Memory board (MEMB#7)

11.1.1 Accessing the Memory Board

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

11.1.2 Removing the Memory Board

1. **Pinch the handles together and pull both levers upwards simultaneously to unseat the memory board.**

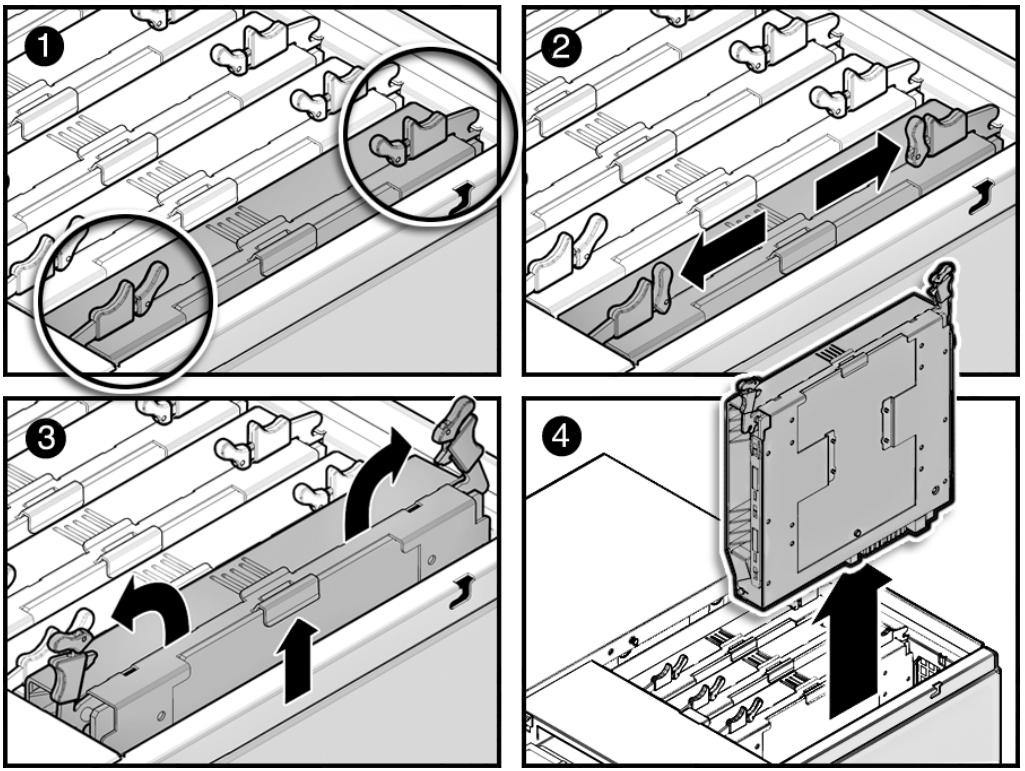
Note – Keep track of the original Memory Board locations so that the boards can be returned to the same locations.

---

2. **Slide the memory board out of the server and place it on the ESD mat.**

Caution – Do not stack more than four memory boards on top of one another.

FIGURE 11-3 Memory Board Removal



11.1.3 Installing the Memory Board

Caution – *Do not force* the memory board into a slot. Doing so can cause damage to the board and server.

1. **Place the memory board in the server.**

   The levers should be extended as far as possible.

Note – Place the Memory Boards into the original locations.

2. **Gently push the memory board into the server until it stops.**
3. **Push the levers inward simultaneously to seat the memory board.**

11.1.4 Securing the Server

1. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the rack antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

2. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

3. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

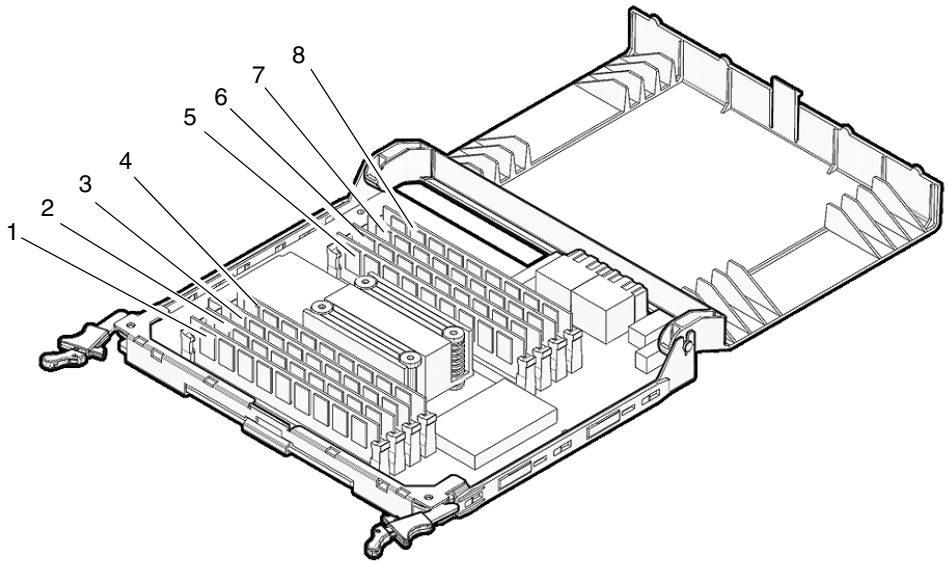
   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

11.2 DIMM Replacement

The DIMMs are cold FRU replacement components. The entire server must be powered off and the power cords disconnected to replace the DIMMS.

FIGURE 11-4 shows the memory board memory slot locations.

FIGURE 11-4 Memory Board DIMM Slot Numbering



Location Number	Component
1	MEM#2A, Memory Slot (Group A)
2	MEM#2B, Memory Slot (Group B)
3	MEM#3A, Memory Slot (Group A)
4	MEM#3B, Memory Slot (Group B)
5	MEM#1B, Memory Slot (Group B)

Location Number	Component
6	MEM#1A, Memory Slot (Group A)
7	MEM#0B, Memory Slot (Group B)
8	MEM#0A, Memory Slot (Group A)

Caution – To replace or install a DIMM, do not fail to confirm the DIMM information and comply with the conditions to mount the memory.

11.2.1 Confirmation of DIMM Information

Confirm the DIMM information (size/rank) in the following way.

- Execute the `showhardconf`(8) command on XSCFU.

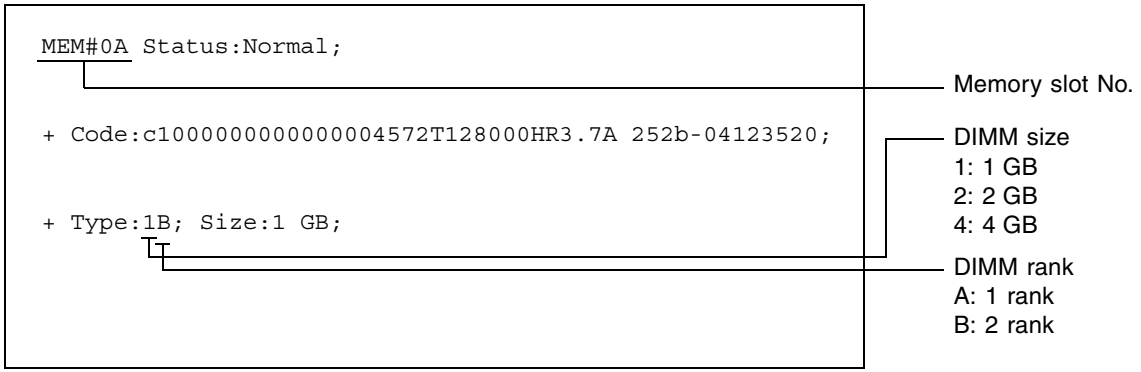
  The Type field shows the DIMM size and the DIMM rank.

CODE EXAMPLE 11-1 `showhardconf`

```
XSCF> showhardconf
...
MBU_B Status:Normal; Ver:0101h; Serial:78670002978: ;
    + FRU-Part-Number:CF00541-0478 01 /541-0478-01 ;
    + Memory_Size:64 GB;
   ...
        MEM#0A Status:Normal;
            + Code:c1000000000000004572T128000HR3.7A 252b-04123520;
            + Type:1B; Size:1 GB;
        MEM#0B Status:Normal;
            + Code:c1000000000000004572T128000HR3.7A 252b-04123e25;
            + Type:1B; Size:1 GB;
        MEM#1A Status:Normal;
            + Code:c1000000000000004572T128000HR3.7A 252b-04123722;
            + Type:1B; Size:1 GB;
        MEM#1B Status:Normal;
            + Code:c1000000000000004572T128000HR3.7A 252b-04123b25;
            + Type:1B; Size:1 GB;
        ...
```

FIGURE 11-5 shows the explanation of DIMM information.

FIGURE 11-5 Explanation of DIMM Information



11.2.2 Memory Installation Configuration Rules

You can mount up to 4 memory boards on the SPARC Enterprise M4000 server and up to 8 memory boards on the SPARC Enterprise M5000 server. The DIMMs on the memory board are grouped into group A and group B. (See FIGURE 11-4).

Here are the DIMM mount conditions:

- In each group, 4 DIMMs are mounted in a unit.
- The size of the DIMMs in group A must be equal to or larger than the size of the DIMMs in group B. You need not necessarily mount DIMMs in group B.
- In each of the groups, mount the DIMM of same size and of same rank. The DIMMs of different size cannot be mixed in a group.
- To replace with the DIMMs of different size or different rank, you need to follow the above conditions on every memory board in the same CMU.

Note – When you upgrade using larger size memory than the size of Group A, move the memory mounted in Group A to Group B, and then mount the upgrade memory to Group A.

11.2.3 Installing Memory:

- Only half or fully populated memory boards may be installed.
- In Uni-XSB mode, 1, 2 or 4 memory boards can be installed per PSB, all must have the same capacity. (3 memory boards is not allowed).
- In Quad-XSB mode, each CPU module must have 1 half populated memory board or 1 fully populated memory board; capacity can be different.

11.2.4 Accessing the DIMMs

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

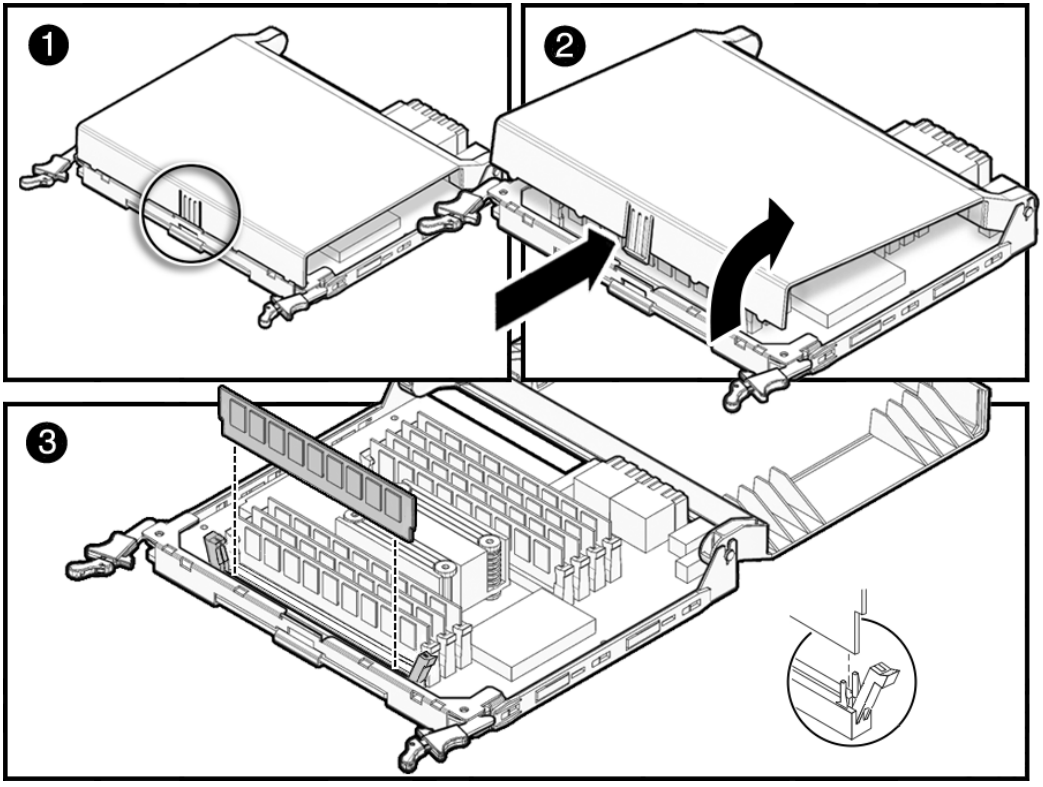
3. **Remove the memory board from the server.**

   See "Removing the Memory Board" on page 11-6.

11.2.5 Removing the DIMMs

1. **Open the plastic hinged DIMM cover on the memory board cover to expose the DIMMs.**
2. **Pull the DIMM eject levers outwards to release the DIMM.**
3. **Pull the DIMM upwards to remove the DIMM from the socket (FIGURE 11-6).**

FIGURE 11-6 DIMM Removal



11.2.6 Installing the DIMMs

1. **Push the DIMM evenly into the DIMM socket.**
2. **Slide the DIMM eject levers inwards to secure the DIMM in place (**FIGURE 11-6**).**
3. **Close the plastic hinged DIMM cover on the memory board cover.**

11.2.7 Securing the Server

1. **Install the memory board in the server.**

   See "Installing the Memory Board" on page 11-7.

2. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the rack antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

3. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

4. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

CHAPTER 12

CPU Module Replacement

This chapter describes how to remove and replace the CPU modules. The information is organized into the following topic:

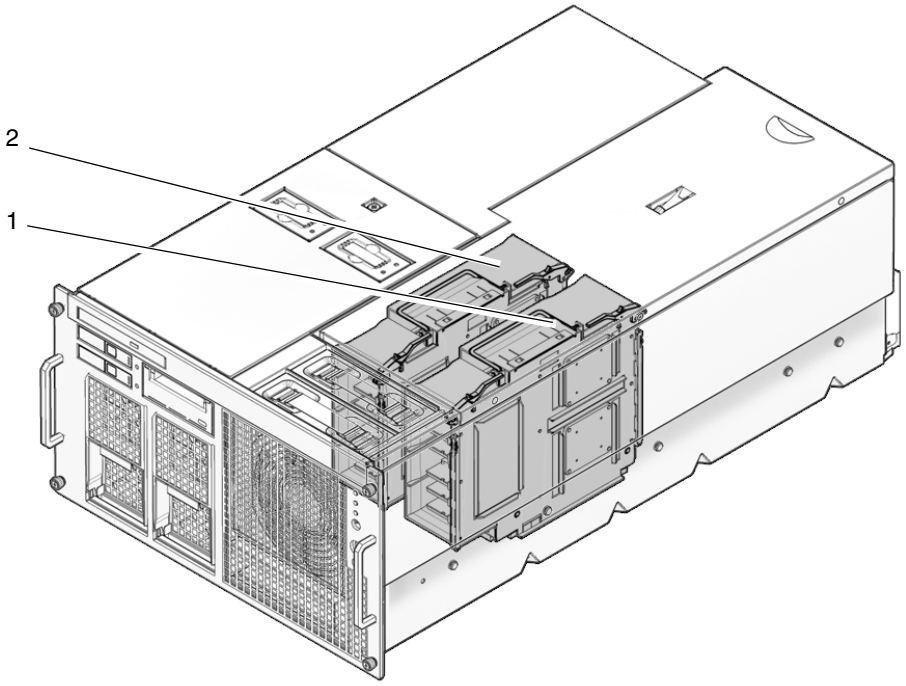
- "CPU Module Replacement" on page 12-1
- "CPU Upgrade" on page 7

12.1 CPU Module Replacement

The CPU modules are cold replacement components. The entire server must be powered off and the power cords disconnected to replace the CPU modules. The CPU modules on the midrange servers are identical.

FIGURE 12-1 shows the CPU module location on the SPARC Enterprise M4000 server.

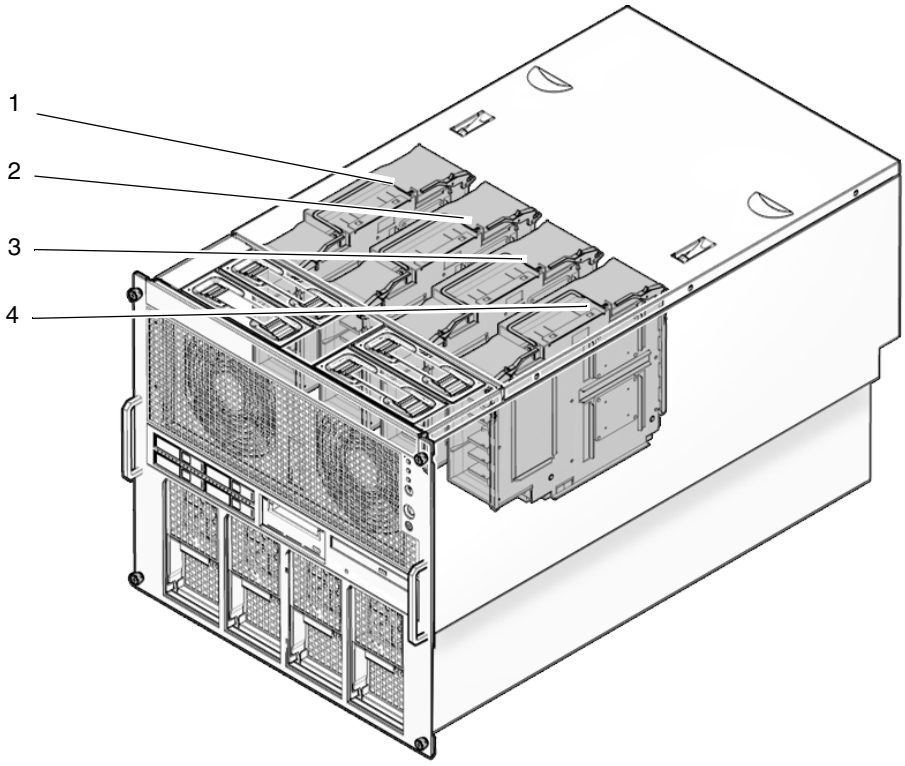
FIGURE 12-1 SPARC Enterprise M4000 CPU Module Locations



Location Number	Component
1	CPU module (CPUM#1)
2	CPU module (CPUM#0)

FIGURE 12-2 shows the CPU module location on the SPARC Enterprise M5000 server.

FIGURE 12-2 SPARC Enterprise M5000 CPU Module Locations



Location Number	Component
1	CPU module (CPUM#0)
2	CPU module (CPUM#1)
3	CPU module (CPUM#2)
4	CPU module (CPUM#3)

12.1.1 Accessing the CPU Module

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

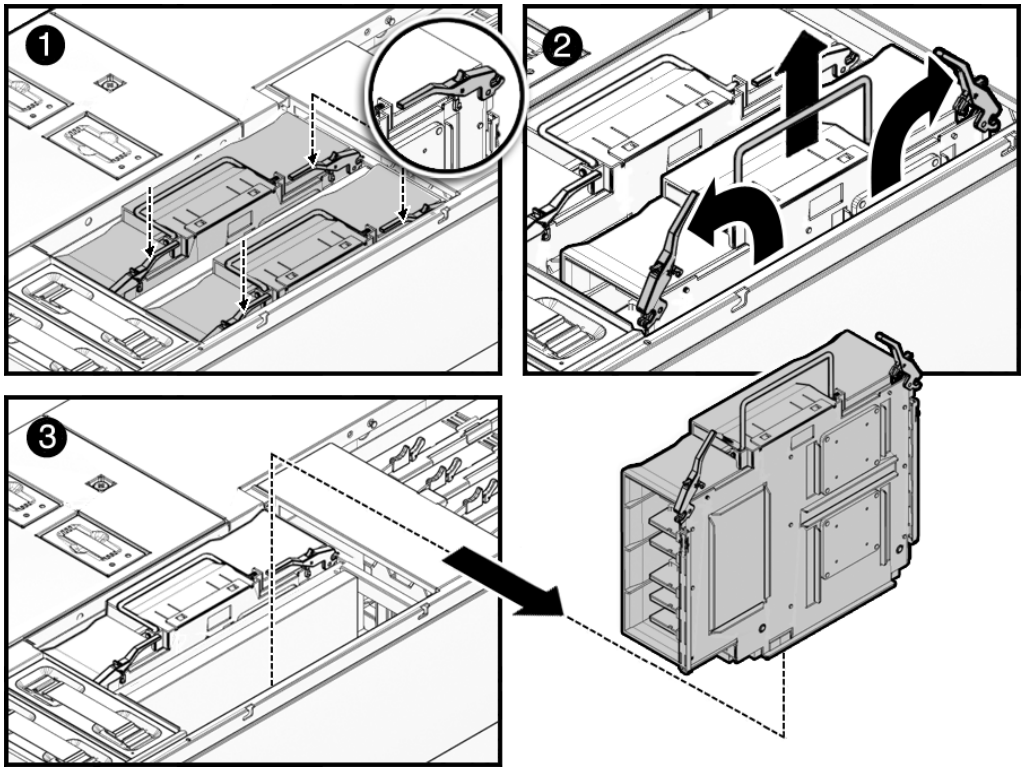
12.1.2 Removing the CPU Module

1. **Unlock the levers and raise both levers simultaneously to unseat the CPU module (FIGURE 12-3).**

Caution – The bottom of the board tends to swing when it is removed.

2. **Remove the CPU module or filler panel from the server and place it on the ESD mat.**

FIGURE 12-3 CPU Module Removal



Caution – Do not stack CPU modules on top of one another or on top of other components.

12.1.3 Installing the CPU Module

Caution – *Do not force* the CPU module into the slot. Doing so can cause damage to the module and server.

1. **Place the CPU module in the open slot.**
2. **Push the levers inward simultaneously to seat the CPU module.**

12.1.4 Securing the Server

1. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

2. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

3. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

12.2 CPU Upgrade

This section describes procedures for installing SPARC64 VII processors in SPARC Enterprise M4000/M5000 servers:

- Section 12.2.1, “SPARC64 VII CPU Modules Added to a New Domain” on page 12-8
- Section 12.2.2, “SPARC64 VII Processors Added to an Existing Domain” on page 12-11

Note – The SPARC64 VII processors are supported by the XCP firmware (beginning with XCP 1070) and Solaris software. For more information about these minimum software and firmware requirements, see the latest version of the Product Notes (no earlier than the XCP 1070 edition) for your server.

Caution – You must complete the upgrades to the XCP firmware and to Solaris before inserting SPARC 64 VII processors into the chassis.

For more information about configuring combinations of processors in domains, refer to Section 2.2.13, “Domain Mode Configuration,” in the *Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User’s Guide*. In particular, see the section “SPARC64 VI and SPARC64 VII Processors and CPU Operational Modes.”

12.2.1 SPARC64 VII CPU Modules Added to a New Domain

▼ Adding a SPARC64 VII CPU Module to a New Domain

Note – If you want to install Solaris 10 8/07 on the new domain, you must install from a patched image on the installation server. (See Step 20.)

---

1. **Log in to the XSCF using an account with `platadm` privileges.**
2. **Confirm that no FRU is currently listed in `Faulted` or `Deconfigured` status.**

```
XSCF> showstatus
```

3. **Turn off the power to all domains.**

```
XSCF> poweroff -a
```

4. **Confirm that all domains have stopped.**

```
XSCF> showlogs power
```

5. **Change the key position on the operator panel from Locked to Service.**
6. **Collect an XSCF snapshot to archive system status prior to upgrade.**

   If a problem should occur during the upgrade procedure, a snapshot of the system status might be helpful.

```
XSCF> snapshot -t user@host:directory
```

7. **Update the XCP version.**

   For instructions for updating the firmware, refer to the *Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

8. **Install the CPU module (CPUM) in the server.**

   For instructions, refer to Section 12.2, "CPU Upgrade" on page 12-7 in the *Sun SPARC Enterprise M4000/M5000 Servers Service Manual*. Note that this procedure involves powering down the entire server.

Caution – After installing the CPU module, you must reconnect the power cable to the power supply.

9. **Log in to the XSCF again, using an account with** `platadm` **or** `fieldeng` **privileges.**

10. **Perform an initial diagnosis of the newly installed CPU module.**

```
XSCF> testsb 01
```

The following example shows a test after adding PSB#01 to a SPARC Enterprise M5000 server:

```
XSCF> testsb 01
Initial diagnosis is about to start. Continue? [y|n] : y
Initial diagnosis is executing.
Initial diagnosis has completed.
XSB Test Fault
---- ------- --------
01 Passed Normal
```

11. **Confirm that the installed CPU module is recognized by the server and that the error indicator asterisk (*) is not displayed.**

```
XSCF> showhardconf -M
```

12. **Confirm that no error has occurred.**

```
XSCF> showlogs error -v
XSCF> showstatus
```

13. **Change the key position on the operator panel from Service to Locked.**

14. **Power on the existing domains.**

```
XSCF> poweron -a
```

15. **Set the following for the added CPU module:**
    - Set up XSB for the added CPU module.
    - Set up the domain.

- Set up the CPU operational mode on the domain.

Refer to Chapter 2, "Setting Up XSCF," in the *Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for information about these settings.

16. **Use the `setdomainmode`(8) command to disable the autoboot function of the domain.**

    Refer to the *Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* and the `setdomainmode`(8) man page for more information.

17. **Power on the new domain.**

```
XSCF> poweron -d domain_id
```

18. **Confirm that the target domain has been correctly started.**

```
XSCF> showlogs power
```

19. **Confirm that no error has occurred.**

```
XSCF> showlogs error -v
XSCF> showstatus
```

20. **Install a version of Solaris OS that supports SPARC64 VII processors.**

Note – The SPARC64 VII processors are supported by the XCP firmware (beginning with XCP 1070) and Solaris software. For more information about these minimum software and firmware requirements, see the latest version of the Product Notes (no earlier than the XCP 1070 edition) for your server.

For information about network-based installations, refer to *Solaris 10 8/07 Installation Guide: Network-Based Installations* (part 820-0177).

21. **Use the `setdomainmode`(8) command to enable the autoboot function of the domain.**

    The autoboot function is applied by a domain reboot. For more information, refer to the *Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* and the `setdomainmode`(8) man page.

12.2.2 SPARC64 VII Processors Added to an Existing Domain

Adding SPARC64 VII Processors to an existing domain is a two step process. First you must prepare the system (see "Preparing to Add SPARC64 VII Processors to an Existing Domain" on page 11) and then you must install the Processors using the instructions that correspond to your installation scenario.

- "Adding a SPARC64 VII CPU Module to a Domain Configured With SPARC64 VI" on page 13.
- "Upgrading a SPARC64 VI CPU Module to SPARC64 VII on an Existing Domain" on page 15

▼ Preparing to Add SPARC64 VII Processors to an Existing Domain

1. **If necessary, upgrade to a version of Solaris OS that supports SPARC64 VII processors.**

Note – The SPARC64 VII processors are supported by the XCP firmware (beginning with XCP 1070) and Solaris software. For more information about these minimum software and firmware requirements, see the latest version of the Product Notes (no earlier than the XCP 1070 edition) for your server.

---

2. **Log in to the XSCF using an account with** `platadm` **privileges.**

3. **Confirm that no FRU is currently listed in** `Faulted` **or** `Deconfigured` **status.**

```
XSCF> showstatus
```

4. **Turn off the power for all the domains.**

```
XSCF> poweroff -a
```

5. **Confirm that the power is off for the domains.**

```
XSCF> showlogs power
```

6. **Change the key position on the operator panel from Locked to Service.**

7. **Collect an XSCF snapshot to archive system status prior to upgrade.**

   If a problem should occur during the upgrade procedure, a snapshot of the system status might be helpful.

```
XSCF> snapshot -t user@host:directory
```

8. **Update the XCP version.**

   For instructions for updating the firmware, refer to the *Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

9. **Log in to the XSCF again, using an account with** `platadm` **or** `fieldeng` **privileges.**

10. **Power on all the domains, and apply OpenBoot PROM firmware.**

```
XSCF> poweron -a
```

   The `ok` prompt is displayed. You do not need to start the Solaris OS.

11. **Check the updated OpenBoot PROM version.**

```
XSCF> version -c cmu -v
```

   The following example shows output for XCP 1081, in which the version of OpenBoot PROM is 02.08.0000:

```
XSCF> version -c cmu -v
DomainID  0: 02.08.0000
DomainID  1: 02.08.0000
DomainID  2: 02.08.0000
DomainID  3: 02.08.0000
XSB#00-0:  02.08.0000(Current)      02.03.0000(Reserve)
XSB#00-1:  02.08.0000(Current)      02.03.0000(Reserve)
XSB#00-2:  02.08.0000(Current)      02.03.0000(Reserve)
XSB#00-3:  02.08.0000(Current)      02.03.0000(Reserve)
XSB#01-0:  02.08.0000(Current)      02.03.0000(Reserve)
XSB#01-1:  02.08.0000(Current)      02.03.0000(Reserve)
XSB#01-2:  02.08.0000(Current)      02.03.0000(Reserve)
XSB#01-3:  02.08.0000(Current)      02.03.0000(Reserve)
...
```

12. **Turn off the power to all the domains.**

```
XSCF> poweroff -a
```

13. **Continue with the appropriate installation procedure:**

- If you are adding a new SPARC64 VII–equipped CPU module to a domain configured with SPARC64 VI processors, continue with "Adding a SPARC64 VII CPU Module to a Domain Configured With SPARC64 VI" on page 13.
- If you are upgrading an existing SPARC64 VI CPU module in an existing domain to SPARC64 VII processors, continue with "Upgrading a SPARC64 VI CPU Module to SPARC64 VII on an Existing Domain" on page 15.

▼ Adding a SPARC64 VII CPU Module to a Domain Configured With SPARC64 VI

This procedure must be preceded by "Preparing to Add SPARC64 VII Processors to an Existing Domain" on page 11. If you have not completed that procedure, do so before continuing.

1. **Install the CPUM in the server.**

   For instructions, refer to the "CPU Module Replacement," chapter in the *Sun SPARC Enterprise M4000/M5000 Servers Service Manual*. Note that this procedure involves powering down the entire server.

Caution – After installing the CPU module, you must reconnect the power cable to the power supply.

2. **Log in to the XSCF again, using an account with** `platadm` **or** `fieldeng` **privileges.**

   Perform an initial diagnosis of the newly installed CPU module.

```
XSCF> testsb 01
```

The following example shows a test after adding PSB#01:

```
XSCF> testsb 01
Initial diagnosis is about to start. Continue? [y|n] : y
Initial diagnosis is executing.
Initial diagnosis has completed.
XSB Test Fault
---- ------- --------
01 Passed Normal
```

3. **Confirm that the installed CPU module is recognized by the server and that the error indicator asterisk (*) is not displayed.**

```
XSCF> showhardconf -M
```

4. **Confirm that no error has occurred.**

```
XSCF> showlogs error -v
XSCF> showstatus
```

5. **Change the key position on the operator panel from Service to Locked.**

6. **Set the following for the CPU module:**
   - Set up XSB.
   - Set up the LSB.
   - Add the XSB to the domain.
   - Set up the CPU operational mode on the domain.

   Refer to Chapter 2, "Setting Up XSCF," in the *Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide* for information about these settings.

7. **Power on all the domains.**

```
XSCF> poweron -a
```

8. **Confirm that all the domains have been correctly started.**

```
XSCF> showlogs power
```

9. **Confirm that no error has occurred.**

```
XSCF> showlogs error -v
XSCF> showstatus
```

▼ Upgrading a SPARC64 VI CPU Module to SPARC64 VII on an Existing Domain

This procedure must be proceeded by "Preparing to Add SPARC64 VII Processors to an Existing Domain" on page 11. If you have not completed that procedure please do so before continuing.

1. **Replace the SPARC64 VI CPU module with the SPARC64 VII CPU module.**

   For instructions, refer to Chapter 12, "CPU Module Replacement," in the *Sun SPARC Enterprise M4000/M5000 Servers Service Manual*. Note that this procedure involves powering down the entire server.

Caution – After installing the CPU module, you must reconnect the power cable to the power supply.

2. **Log in to the XSCF again, using an account with `platadm` or `fieldeng` privileges.**

3. **Perform an initial diagnosis of the newly installed CPU module.**

```
XSCF> testsb 01
```

   The following example shows a test after adding PSB#01 to a SPARC Enterprise M5000 server:

```
XSCF> testsb 01
Initial diagnosis is about to start. Continue? [y|n] : y
Initial diagnosis is executing.
Initial diagnosis has completed.
XSB Test Fault
---- ------- --------
01 Passed Normal
```

4. **Confirm that the installed CPU module is recognized by the server and that the error indicator asterisk (*) is not displayed.**

```
XSCF> showhardconf -M
```

5. **Confirm that no error has occurred.**

```
XSCF> showlogs error -v
XSCF> showstatus
```

6. **Change the key position on the operator panel from Service to Locked.**

7. **Set up and confirm the CPU operational mode of the domain.**

   For more information, refer to Chapter 2, "Setting Up XSCF," in the *Sun SPARC Enterprise M3000/M4000/M5000/M8000/M9000 Servers XSCF User's Guide*.

8. **Power on all the domains.**

```
XSCF> poweron -a
```

9. **Confirm that the target domain has been correctly started.**

```
XSCF> showlogs power
```

10. **Confirm that no error has occurred.**

```
XSCF> showlogs error -v
XSCF> showstatus
```

CHAPTER 13

Motherboard Unit Replacement

This chapter describes how to remove and replace the motherboard. The information is organized into the following topic:

- "Motherboard Unit Replacement" on page 13-1
- "DC-DC Converter Replacement" on page 13-12

13.1 Motherboard Unit Replacement

The motherboard unit is a cold replacement component. This means the entire server must be powered off and the power cords disconnected to replace the motherboard unit.

FIGURE 13-1 shows the location of the motherboard unit on the SPARC Enterprise M4000 server.

FIGURE 13-1 SPARC Enterprise M4000 Motherboard Unit Location

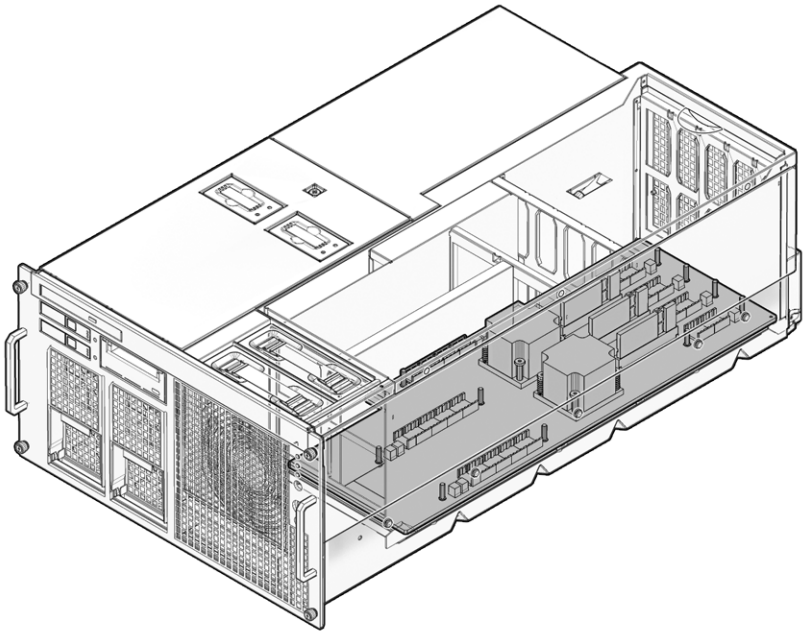
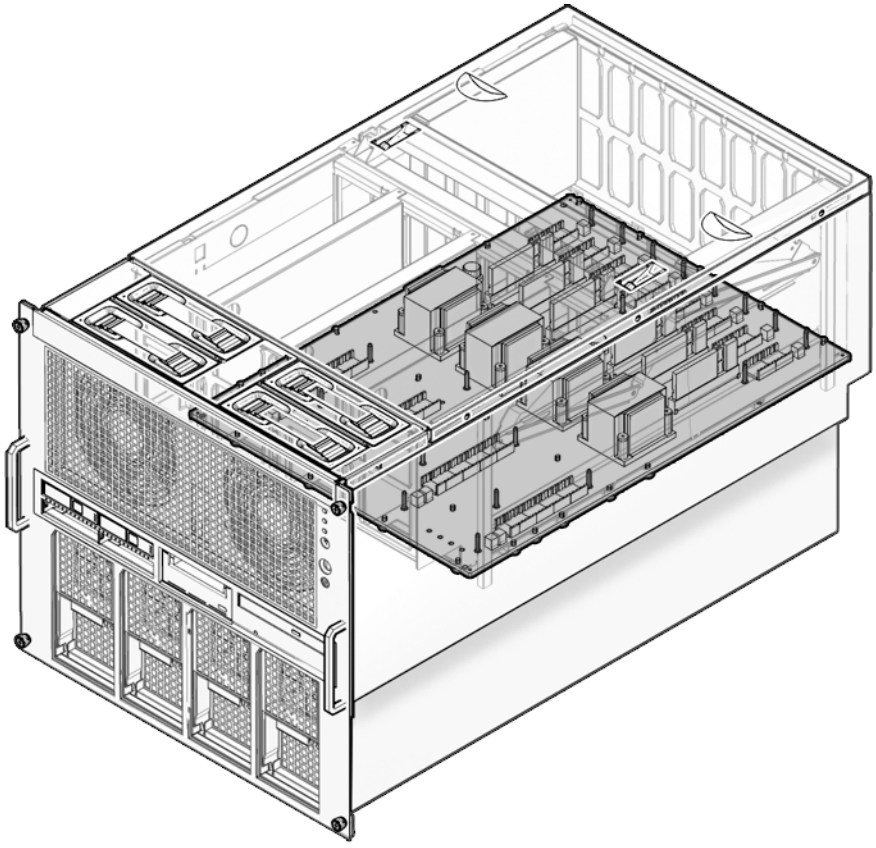


FIGURE 13-2 shows the location of the motherboard unit on the SPARC Enterprise M5000 server.

FIGURE 13-2 SPARC Enterprise M5000 Motherboard Unit Location



13.1.1 Accessing the SPARC Enterprise M4000 Motherboard Unit

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

3. **Remove all CPU modules and filler panels.**

   See "Removing the CPU Module" on page 12-5.

Note – If the motherboard unit is only being removed to provide access to the busbar, and the weight of the motherboard is not a problem, Step 4 can be skipped.

4. **Remove all of the memory boards.**

   See "Removing the Memory Board" on page 11-6.

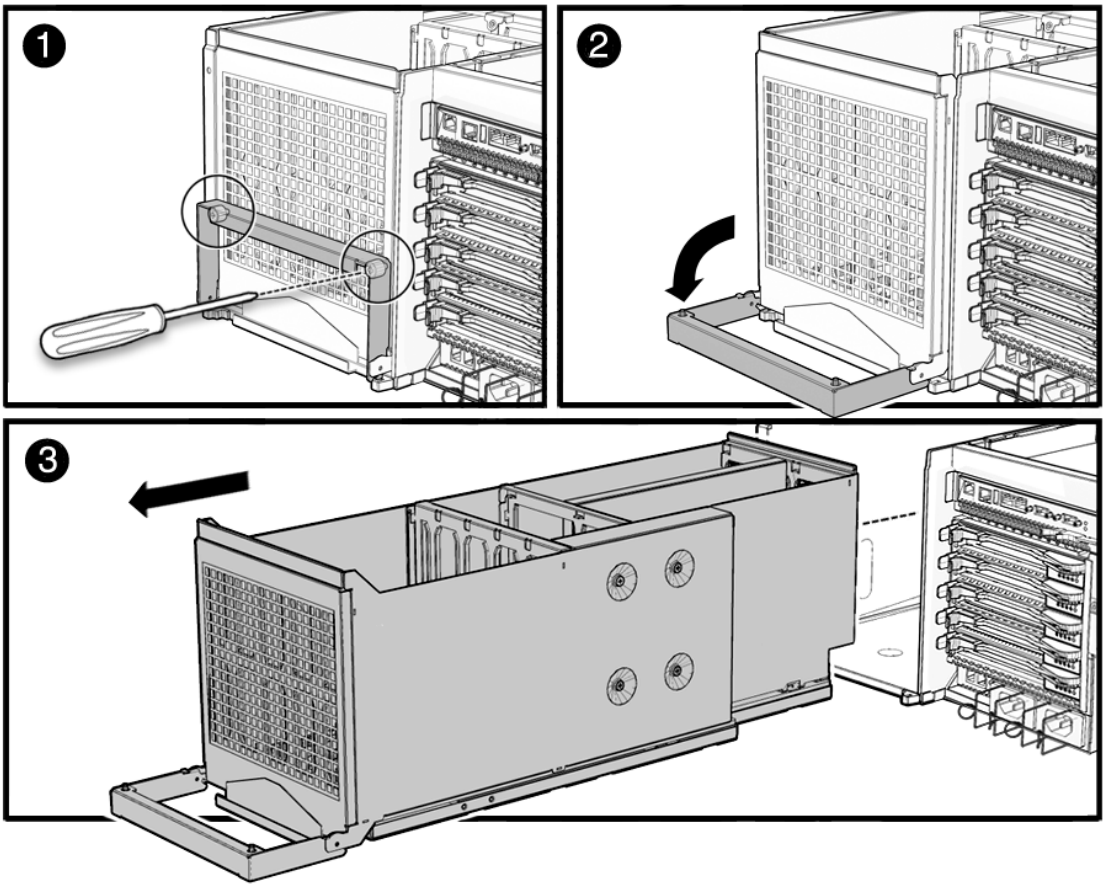
5. **Loosen the two (2) captive screws that secure the cable management arm to the left rear of the server.**

6. **Disconnect the cable management arm from the equipment rack.**

13.1.2 Removing the SPARC Enterprise M4000 Motherboard Unit

1. **Push the server back into the rack.**
2. **Loosen the two captive screws that secure the motherboard unit handle in place.**
3. **Pull the motherboard unit handle down (FIGURE 13-3).**

FIGURE 13-3 Removing the SPARC Enterprise M4000 Motherboard Unit



Caution – The motherboard unit is a long and heavy assembly that houses the system motherboard on the underside. The motherboard unit is heavy. Two people are recommended to lift the unit.

4. **Remove the motherboard unit from the server.**

   Be careful not to damage the connectors while removing the unit from the server.

13.1.3 Installing the SPARC Enterprise M4000 Motherboard Unit

Caution – The motherboard is heavy. Two people are recommended to lift the unit.

1. **Align the motherboard unit and slide it into the rear of the server.**
2. **Push the motherboard unit handle up to seat the board.**
3. **Tighten the two (2) captive screws to secure the motherboard unit handle.**
4. **Pull the system out of the rack.**

13.1.4 Securing the Server

1. **Install all CPU modules and filler panels.**

   See "Installing the CPU Module" on page 12-6.

2. **Install all memory boards.**

   See "Installing the Memory Board" on page 11-7.

3. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

4. **Tighten the two captive screws that secure the cable management arm to the left rear of the server.**
5. **Connect the cable management arm to the equipment rack.**
6. **Power on the server**

   This step includes reconnecting power cables, verifying the state of the LEDs,

and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

7. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

13.1.5 Accessing the SPARC Enterprise M5000 Motherboard Unit

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

---

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

---

2. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

---

3. **Remove all CPU modules and filler panels.**

   See "Removing the CPU Module" on page 12-5.

Note – If the motherboard unit is only being removed to provide access to the busbar, and the weight of the motherboard is not a problem, Step 4 can be skipped.

---

4. **Remove all of the memory boards.**

   See "Removing the Memory Board" on page 11-6.

13.1.6 Removing the SPARC Enterprise M5000 Motherboard Unit

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

---

1. **Release the latch and pull the two (2) CPU module baffles out of the server (**FIGURE 13-4**).**
2. **Remove the eight (8) bus bar screws at the front of the server using a magnetic screwdriver.**
3. **Loosen the two (2) captive screws in the center of the motherboard unit to release the motherboard unit handles.**
4. **Pull the motherboard unit handles until they are vertical.**

   This unseats the motherboard unit from the backplane.

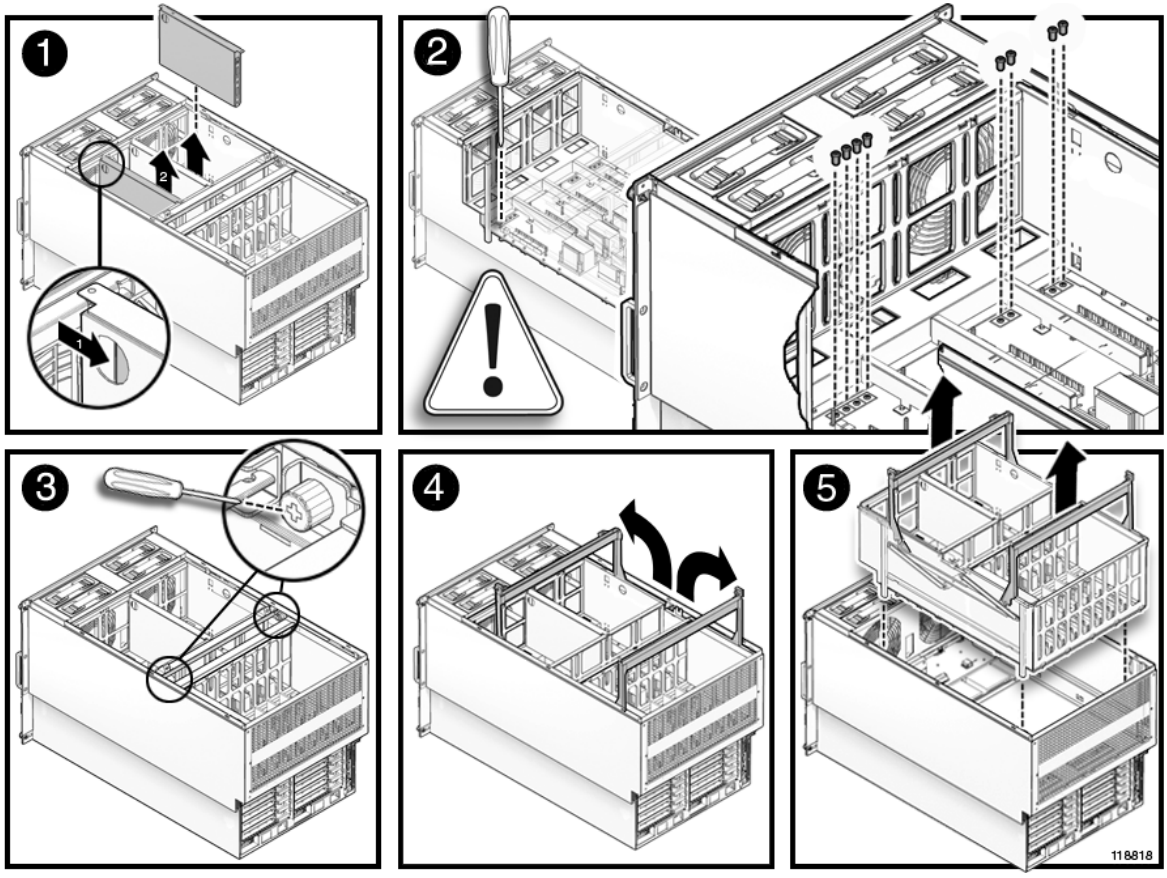
Caution – The motherboard is heavy. Two people are recommended to lift the unit. If the unit is too heavy the memory boards can be removed prior to lifting the unit.

---

5. **Lift the unit out of the server.**

   The unit has small feet so that it can rest on its bottom without damaging the motherboard connectors.

FIGURE 13-4 Removing the SPARC Enterprise M5000 Motherboard Unit



13.1.7 Installing the SPARC Enterprise M5000 Motherboard Unit

Caution – The motherboard is heavy. Two people are recommended to lift the unit.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Align the motherboard unit feet with the rails and lower the unit into the server.**
2. **Push the motherboard unit handles down until they are horizontal to seat the board.**
3. **Tighten the two (2) captive screws in the center of the motherboard unit to secure the motherboard unit handles in place.**
4. **Secure the eight (8) bus bar screws at the front of the motherboard unit using a magnetic screwdriver.**
5. **Install the two (2) CPU module baffles and secure them with the latches.**

13.1.8 Securing the Server

1. **Install the CPU modules and filler panels.**

   See "Installing the CPU Module" on page 12-6.

2. **Install all memory boards.**

   See "Installing the Memory Board" on page 11-7.

3. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

4. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

5. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

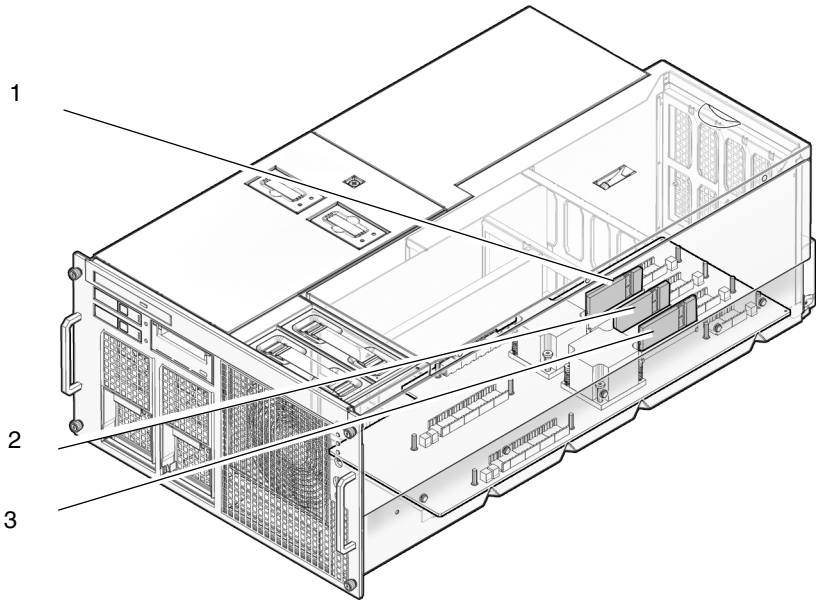
   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

13.2 DC-DC Converter Replacement

The DC-DC converters are cold replacement components. This means the entire server must be powered off and the power cords disconnected to replace a DC-DC converter.

FIGURE 13-5 shows the location of the DC-DC converter on the SPARC Enterprise M4000 server.

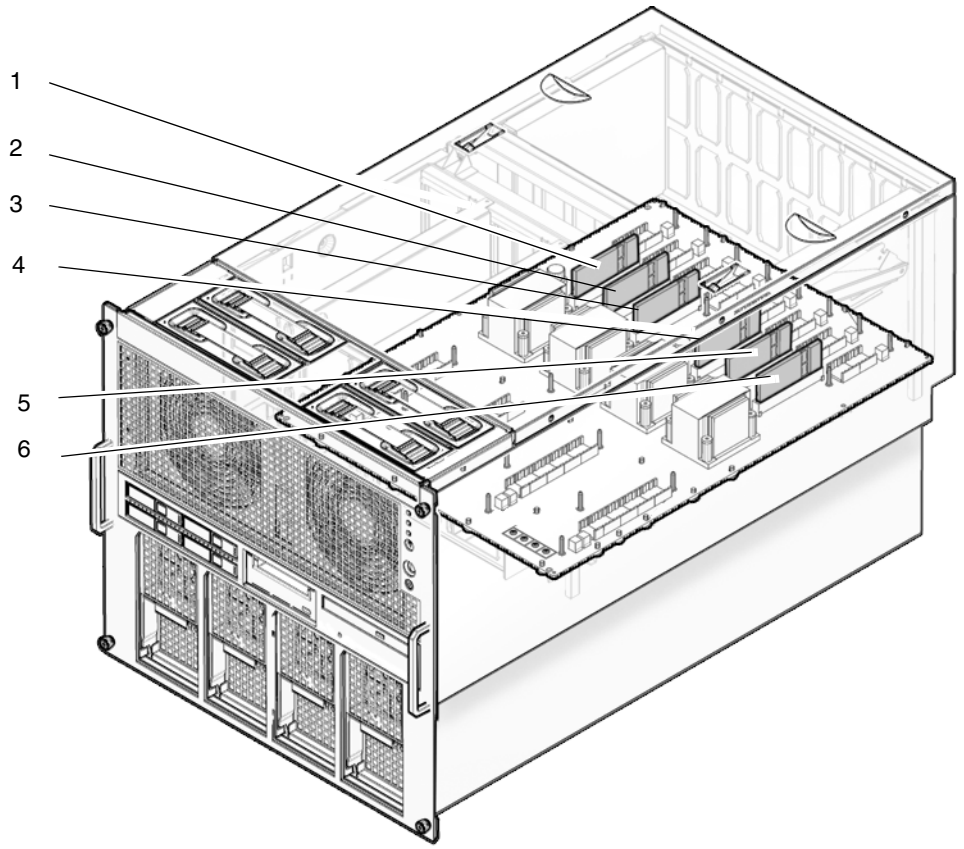
FIGURE 13-5 SPARC Enterprise M4000 DC-DC Converter Location



Location Number	Component
1	DC-DC Converter (DDC_B#0) (with metal heatsink)
2	DC-DC Converter (DDC_A#0)
3	DC-DC Converter (DDC_A#1)

FIGURE 13-6 shows the location of the DC-DC converter on the SPARC Enterprise M5000 server.

FIGURE 13-6 SPARC Enterprise M5000 DC-DC converter Location



Location Number	Component
1	DC-DC Converter (DDC_A#0)
2	DC-DC Converter (DDC_A#1)
3	DC-DC Converter (DDC_A#2)
4	DC-DC Converter (DDC_A#3)
5	DC-DC Converter (DDC_B#0) (with metal heatsink)
6	DC-DC Converter (DDC_B#1) (with metal heatsink)

13.2.1 Accessing the SPARC Enterprise M4000 DC-DC Converter

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

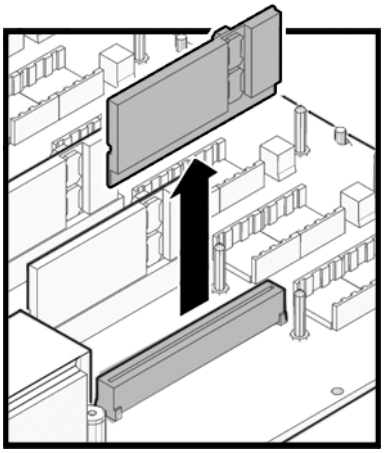
3. **Remove the memory boards adjacent to the DC-DC converter being replaced.**

   See "Removing the Memory Board" on page 11-6.

13.2.2 Removing the SPARC Enterprise M4000 DC-DC Converter

- **Pull the DC-DC converter from the socket and place it on the ESD mat (FIGURE 13-7).**

FIGURE 13-7 Removing the DC-DC Converter



13.2.3 Installing the SPARC Enterprise M4000 DC-DC Converter

Caution – The converter designed to go into slot DDC_B#0 has a metal heatsink. If this converter is installed in any of the other slots, or if the converters without heatsinks are installed in slot DDC_B#0, serious system damage might result.

1. **Place the DC-DC converter in the open slot.**
2. **Push gently downward to seat the DC-DC converter in the slot.**

13.2.4 Securing the Server

1. **Install all memory boards.**

   See "Installing the Memory Board" on page 11-7.

2. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

3. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

4. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

13.2.5 Accessing the SPARC Enterprise M5000 DC-DC Converter

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

3. **Remove the memory boards adjacent to the DC-DC converter being replaced.**

   See "Removing the Memory Board" on page 11-6.

13.2.6 Removing the SPARC Enterprise M5000 DC-DC Converter

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

- **Pull the DC-DC converter from the socket and place it on the ESD mat (**FIGURE 13-7**).**

13.2.7 Installing the SPARC Enterprise M5000 DC-DC Converter

Caution – The converters designed to go into slots DDC_B#0 and DDC_B#1 have metal heatsinks. If these converters are installed in any of the other slots, or if the converters without heatsinks are installed in these slots, serious system damage may result.

1. **Place the DC-DC converter in the open slot.**
2. **Push gently downward to seat the DC-DC converter in the slot.**

13.2.8 Securing the Server

1. **Install all memory boards.**

   See "Installing the Memory Board" on page 11-7.

2. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

3. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

4. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

CHAPTER 14

Backplane Unit Replacement

The backplane unit is composed of the power supply and I/O backplane. The SPARC Enterprise M5000 backplane unit also includes the bus bar. Removing and replacing the backplane unit requires shutting the server down entirely and removing the I/O units, power supplies, and the motherboard. This chapter contains the following topic:

- "Backplane Unit Replacement" on page 14-1

14.1 Backplane Unit Replacement

The backplane unit is a cold replacement component. This means the entire server must be powered off and the power cords disconnected to replace the backplane unit.

FIGURE 14-1 shows the backplane unit location on the SPARC Enterprise M4000 server.

FIGURE 14-1 SPARC Enterprise M4000 Backplane Unit Location

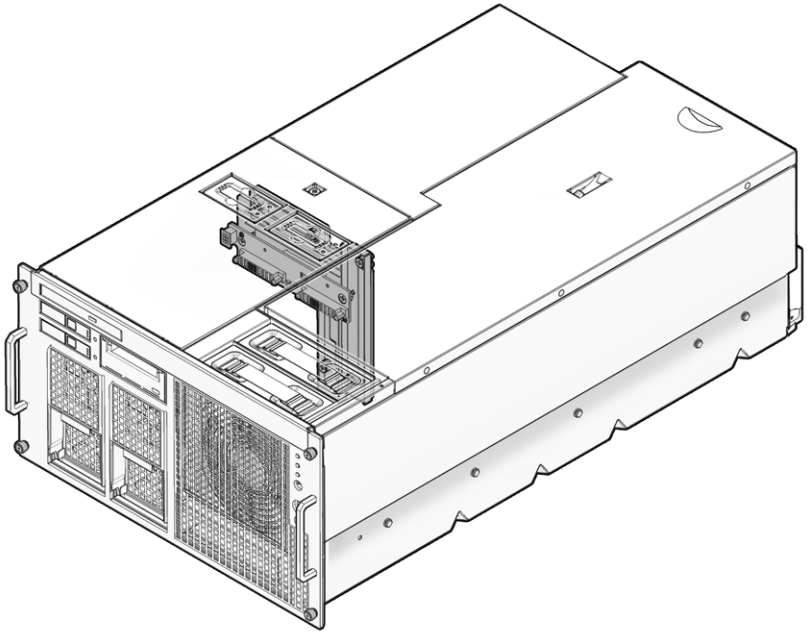
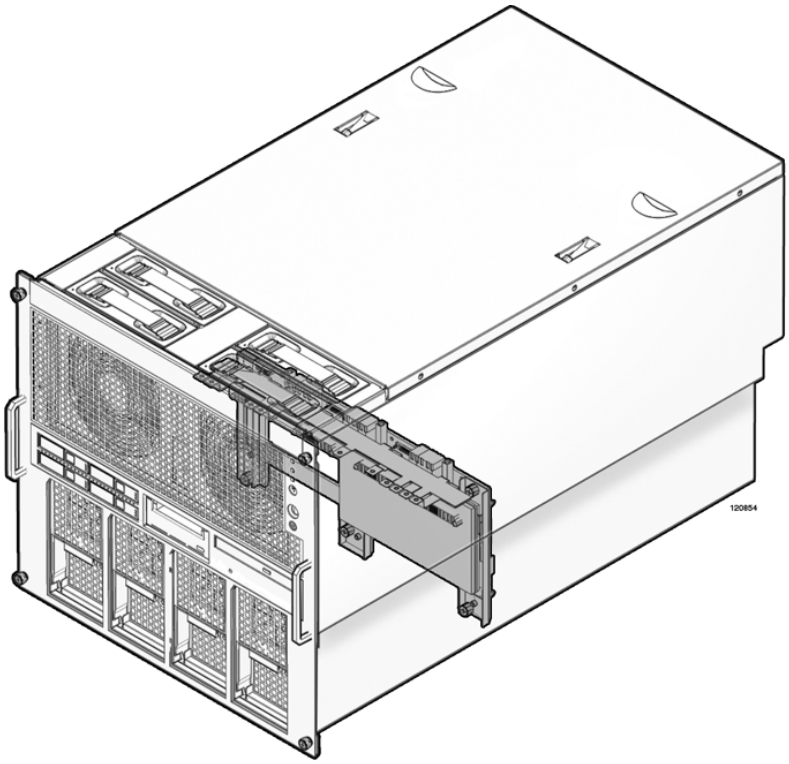


FIGURE 14-2 shows the backplane unit location on the SPARC Enterprise M5000 server.

FIGURE 14-2 SPARC Enterprise M5000 Backplane Unit Location



14.1.1 Accessing the SPARC Enterprise M4000 Backplane Unit

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

2. **Remove the I/O unit.**

   Removing the I/O unit includes multiple steps such as removing labelling and disconnecting the cables, removing the PCI cassettes, and disconnecting the cable management arm. See "Removing the I/O Unit" on page 8-10.

3. **Remove the XSCF unit.**

   See "Removing the XSCF Unit" on page 9-4.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

4. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – The motherboard unit is a long and heavy assembly that houses the system motherboard on the underside. Two people are recommended to lift the unit.

5. **Remove the motherboard unit.**

   This step includes removing the CPU modules, possibly the memory boards, disconnecting the cable management arm, and removing the motherboard. See "Removing the SPARC Enterprise M4000 Motherboard Unit" on page 13-5.

6. **Remove the power supply units.**

   See "Removing the Power Supply Unit" on page 7-4.

7. **Remove the fan cover.**

   a. **Remove the 60-mm fan units and place them on an ESD mat.**

      See "Removing the 60-mm Fan Module" on page 10-5.

   b. **Loosen the captive screw on the fan cover.**

   c. **Lift the rear edge of the fan cover and remove it.**

Note – Support the bottom of the power supply with one hand to avoid the rear of the unit swinging and hitting the system as it is removed.

---

8. **Remove the CD-RW/DVD-RW Drive Backplane.**

   This step includes removing the CD-RW/DVD-RW Drive Unit and the CD-RW/DVD-RW Drive Backplane. See "Removing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-17.

9. **Remove the 60-mm fan backplane.**

   This step includes removing the cable connectors, loosening the captive screws and removing the 60-mm fan backplane. See "Removing the 60-mm Fan Backplane" on page 10-11.

14.1.2 Removing the SPARC Enterprise M4000 Backplane Unit

1. **Disconnect the backplane unit cables.**

   The backplane unit ships with the cables so the old cables should be removed.

   a. **Disconnect the flat red cable from the bottom left of the backplane unit.**

   b. **Disconnect the blue serial cables from the storage device backplanes.**

   c. **Disconnect the power cables from the storage device backplanes.**

   d. **Remove the cables from the plastic cable router.**

e. **Loosen the backplane end of the ground cable and disconnect the cable.**

2. **Loosen the eight(8) green captive screws that hold the backplane unit in position (**FIGURE 14-3**).**

   The screws can be accessed through the now empty power supply unit sockets. The sockets have flaps that close for thermal reasons. If the flaps trap your hand lift your hand upwards rather than outwards to free it.

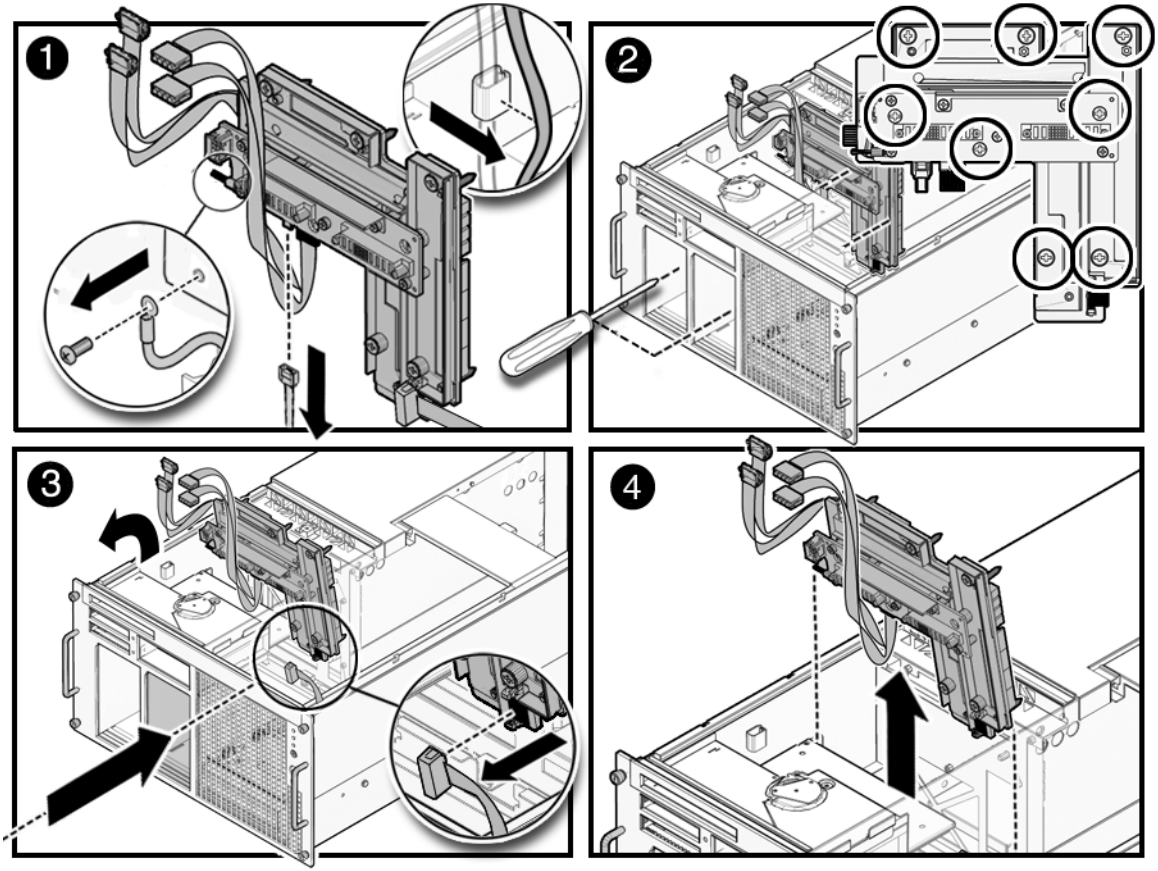
3. **Remove the backplane unit.**

   a. **Angle the backplane unit and then pull it partially out of the server.**

   b. **Reach one hand through the power supply opening and disconnect the grey operator panel cable from the backplane unit.**

   c. **Remove the backplane unit and place it on an ESD mat.**

FIGURE 14-3 Removing the SPARC Enterprise M4000 Backplane



14.1.3 Installing the SPARC Enterprise M4000 Backplane Unit

1. **Remove the ground cable and operator panel cable from the backplane unit.**

   These cables were left in the system.

2. **Install the backplane unit.**

   a. **Angle the backplane unit and place it into the server.**

   b. **Make sure the cables are attached and held out of the way.**

   c. **Reach one hand through the power supply opening and attach the grey operator panel cable to the bottom right of the backplane unit.**

3. **Tighten the eight (8) green captive screws that hold the backplane unit in position.**

4. **Position the cables in the plastic cable router.**

   One bundle of multicolored cables does not fit in the router, all other cables should fit. You must pay particular attention to the long blue serial cable that need to reach to the tape backplane.

5. **Reconnect the backplane end of the ground cable.**

6. **Install the 60-mm fan backplane.**

   This step includes installing the 60-mm fan backplane, tightening the captive screws and securing the cable connectors. See "Installing the 60-mm Fan Module" on page 10-6.

7. **Attach the backplane unit cables.**

   a. **Connect the flat red cable to the hard disk drive backplane.**

   b. **Connect the hard disk drive power cable (p3) to the hard disk drive backplane.**

   c. **Connect the tape drive unit serial cable to the tape drive.**

   d. **Connect the tape drive unit power cable (p4) to the tape drive.**

14.1.4 Securing the Server

1. **Install the CD-RW/DVD-RW Drive Backplane.**

   This step includes installing the CD-RW/DVD-RW Drive Backplane and the CD-RW/DVD-RW Drive Unit. See "Installing the CD-RW/DVD-RW Drive Backplane of the SPARC Enterprise M4000 Server" on page 6-18.

2. **Install the fan cover.**

   a. **Align the tabs on the forward section of the fan cover and push the cover down to secure it in place.**

   b. **Tighten the captive screw on the fan cover.**

   c. **Install the 60-mm fans.**

Caution – The motherboard unit is a long and heavy assembly that houses the system motherboard on the underside. Two people are recommended to lift the unit.

3. **Install the motherboard unit.**

   This step includes installing the CPU modules and reattaching the cable management arm. See "Installing the SPARC Enterprise M4000 Motherboard Unit" on page 13-6.

4. **Install the XSCF unit.**

   See "Installing the XSCF Unit" on page 9-5.

5. **Install the I/O unit.**

   See "Installing the I/O Unit" on page 8-11.

6. **Install the power supply units.**

   See "Installing the Power Supply Unit" on page 7-5.

7. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the rack antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

8. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

9. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

14.1.5 Accessing the SPARC Enterprise M5000 Backplane Unit

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

2. **Remove the I/O units.**

   Removing the I/O unit includes multiple steps such as removing labelling and disconnecting the cables, removing the PCI cassettes, and disconnecting the cable management arm. See "Removing the I/O Unit" on page 8-10.

3. **Remove the XSCF unit.**

   See "Removing the XSCF Unit" on page 9-4.

4. **Remove the power supply units.**

   See "Removing the Power Supply Unit" on page 7-4.

5. **Remove the top cover.**

   This step includes deploying the rack's antitilt features (if applicable), sliding the server out of the equipment rack, and removing the top cover. See "Removing the Top Cover" on page 5-5.

Caution – The motherboard unit is a heavy assembly that houses the system motherboard on the underside. Two people are recommended to lift the unit. The unit has small feet so that it can rest on its bottom without damaging the motherboard connectors.

6. **Remove the motherboard unit.**

   This step includes removing the CPU modules, possibly removing the memory boards, removing the CPU module baffles, loosening the eight (8) busbar screws, loosening the captive screws on the motherboard unit handle and removing the motherboard. See "Removing the SPARC Enterprise M5000 Motherboard Unit" on page 13-8.

14.1.6 Removing the SPARC Enterprise M5000 Backplane Unit

1. **Unscrew and disconnect the red cable from the backplane unit.**
2. **Unscrew and disconnect the white cable from the backplane unit.**
3. **Disconnect the two (2) blue serial cables from the backplane unit.**
4. **Disconnect the black fan backplane power cable from the backplane unit.**

   This cable can be removed using one hand on the cable latch and the other passing through the power supply bays to pull the cable itself.

5. **Loosen the six (6) captive screws that hold the backplane unit in position (**FIGURE 14-4**).**

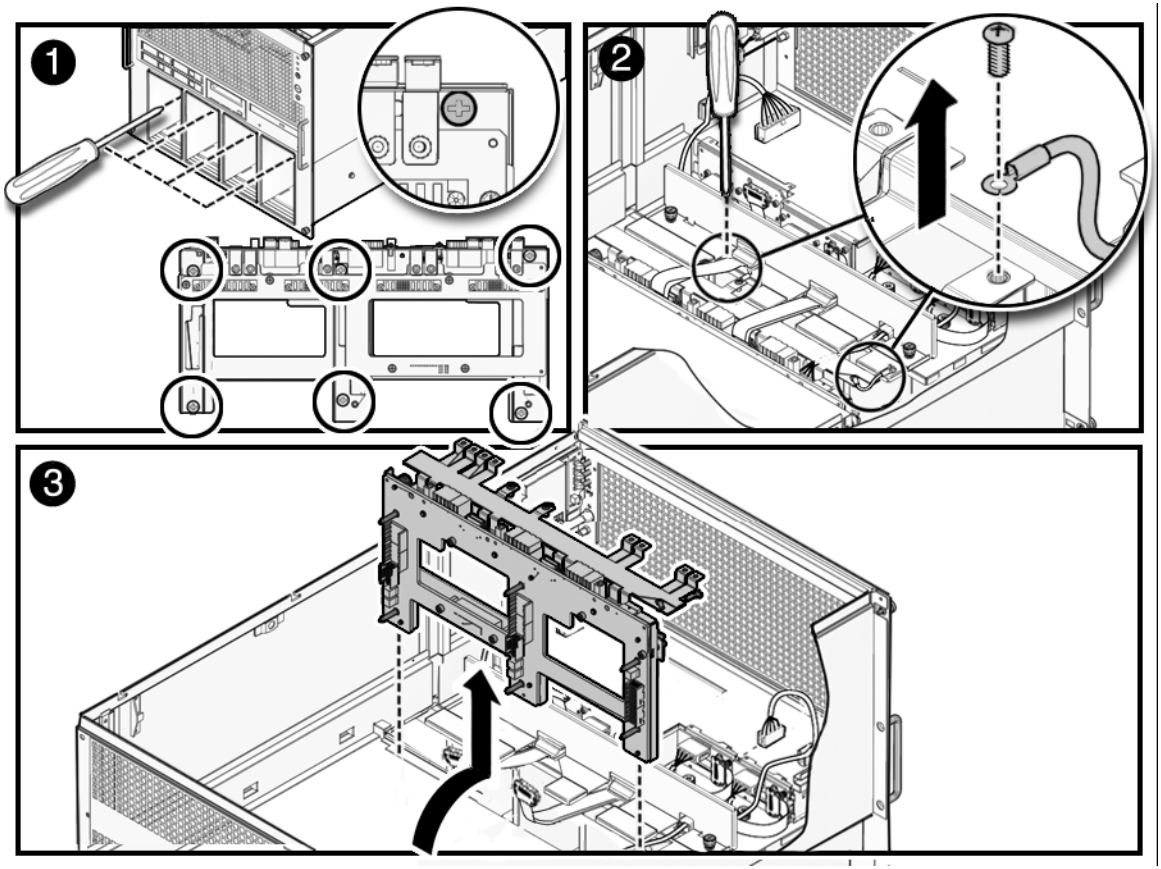
   The captive screws can be accessed by reaching through the power supply bays.

6. **Disconnect the server end of the ground cable.**
7. **Tip the backplane unit forward and then pull it out of the server and place it on an ESD mat.**

8. **Disconnect the ground cable from the backplane unit.**

   Save the ground cable to reattach to the replacement backplane unit.

FIGURE 14-4 Removing the SPARC Enterprise M5000 Backplane



14.1.7 Installing the SPARC Enterprise M5000 Backplane Unit

1. **Connect the ground cable to the backplane unit.**

   The ground cable should have been saved when the backplane was removed.

2. **Place the backplane unit into the server.**

3. **Tighten the six (6) captive screws that hold the backplane unit in position.**

   The captive screws can be accessed by reaching through the power supply bays.

4. **Secure the server end of the ground cable.**

   The cable should be pushed as low as possible to be out of the way of the motherboard unit.

5. **Secure the two (2) blue serial cables to the backplane unit.**

6. **Secure the black fan backplane power cable to the backplane unit.**

7. **Tighten the screws that secure the red cable to the busbar (to the left).**

8. **Tighten the screws that secure the white cable to the busbar (to the right).**

14.1.8 Securing the Server

Caution – The motherboard is heavy. Two people are recommended to lift the unit.

1. **Install the motherboard unit.**

   This step includes installing the mother board cradle, tightening the captive screws on the motherboard unit handles, tightening the eight (8) busbar screws, installing the CPU module baffles, and the CPU modules. See "Installing the SPARC Enterprise M5000 Motherboard Unit" on page 13-10.

2. **Install the XSCF unit.**

   See "Installing the XSCF Unit" on page 9-5.

3. **Install the I/O unit.**

   See "Installing the I/O Unit" on page 8-11.

4. **Install the power supply units.**

   See "Installing the Power Supply Unit" on page 7-5.

5. **Install the top cover.**

   This step includes sliding the server in to the equipment rack and restoring the antitilt features to their original position. See "Replacing the Top Cover" on page 5-8.

6. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

Note – If the Solaris automatic booting is set, use the `sendbreak -d` *domain_id* command after the display console banner is displayed but before the system starts booting the operating system to get the `ok` prompt.

---

7. **Confirm the hardware.**

   This step includes running programs to be certain all components are mounted again and then booting the operating system.

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

CHAPTER 15

Operator Panel Replacement

This chapter describes how to remove and install the operator panel. The information is organized into the following topic:

- "Operator Panel Replacement" on page 15-1
- "Accessing the Operator Panel" on page 15-4

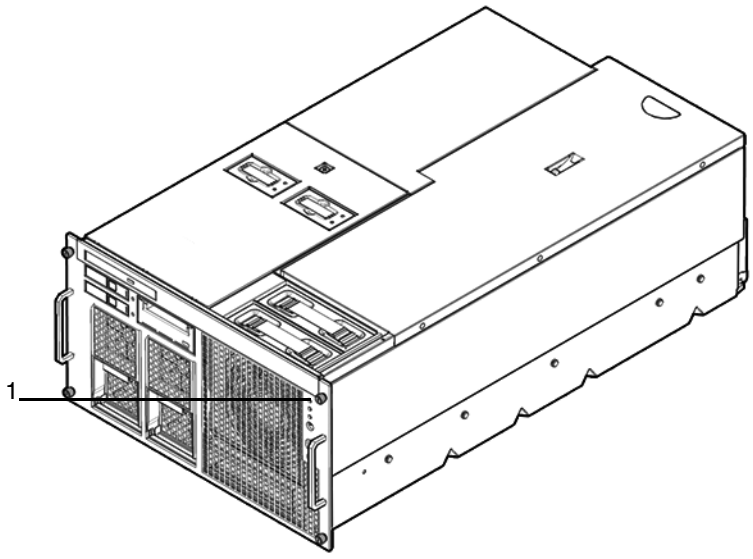
15.1 Operator Panel Replacement

The operator panel is a cold replacement component. This means the entire server must be powered off and the power cords disconnected to replace the operator panel.

Note – If you replace the XSCF unit and the operator panel simultaneously, system will not operate normally. Execute the `showhardconf` command or the `showstatus` command to confirm that the component replaced earlier is operating normally, before replacing the subsequent FRU.

FIGURE 15-1 shows the location of the operator panel on the SPARC Enterprise M4000 server.

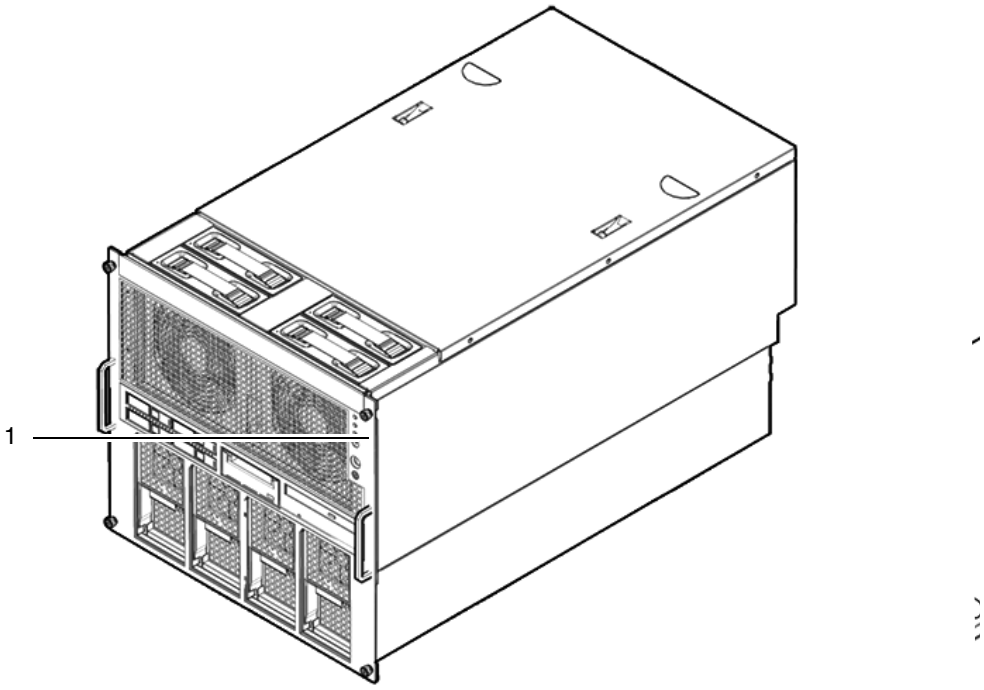
FIGURE 15-1 SPARC Enterprise M4000 Operator Panel Locations



Location Number	Component
1	Operator panel

FIGURE 15-2 shows the location of the operator panel on the SPARC Enterprise M5000 server.

FIGURE 15-2 SPARC Enterprise M5000 Operator Panel Locations



Location Number	Component
1	Operator panel

15.2 Accessing the Operator Panel

Caution – There is an electrical hazard if the power cords are not disconnected. All power cords must be disconnected to completely remove power from the server.

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Power off the server.**

   This step includes turning the key switch to the Service position, confirming that the POWER LED is off, and disconnecting power cables. See "Powering the Server Off Using Software" on page 4-12.

Caution – To prevent the equipment rack from tipping over, you must deploy the antitilt feature, if applicable, before you slide the server out of the equipment rack.

Note – When drawing out the SPARC Enterprise M4000/M5000 Server to the front, release the cable tie holding the PCI cables on the rear of the server.

2. **Deploy the rack's antitilt features (if applicable) and slide the server out of the equipment rack.**

   See "Sliding the Server Out of the Equipment Rack" on page 5-2.

3. **Remove the 172-mm fan units.**

   See "Removing the 172-mm Fan Module" on page 10-8.

4. **Loosen the three (3) captive screws and remove the fan cage.**

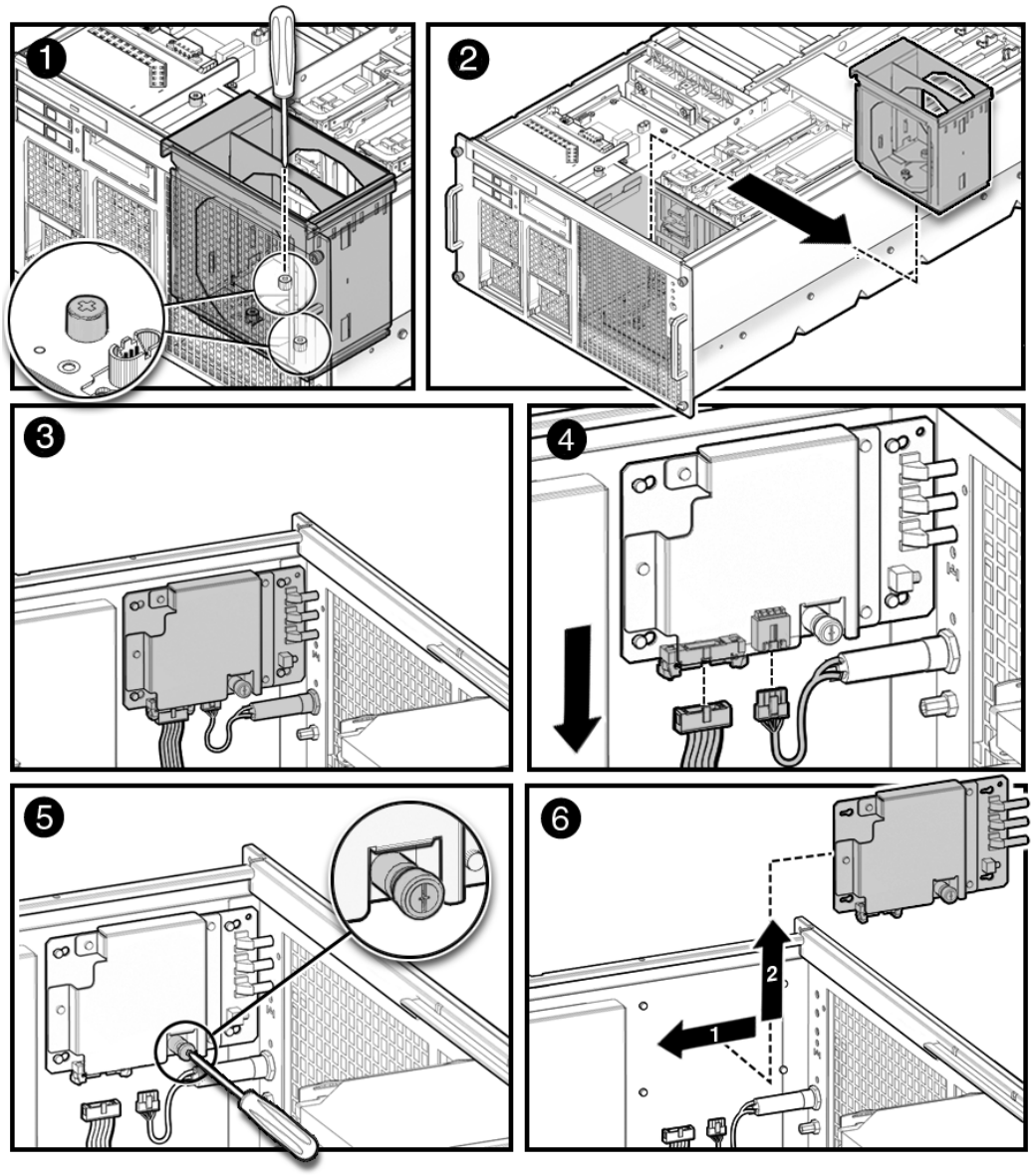
   The SPARC Enterprise M4000 server uses only two (2) captive screws.

15.2.1 Removing the Operator Panel

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Pull the levers outwards and disconnect the operator panel keyswitch cable (FIGURE 15-3).**
2. **Press the small tab and disconnect the operator panel signal cable.**
3. **Loosen the captive screw that holds the operator panel in place.**
4. **From the front, push the operator panel towards the interior of the server.**
5. **Remove the operator panel from the guide pins and place it on the ESD mat.**

FIGURE 15-3 Removing the Operator Panel



15.2.2 Installing the Operator Panel

Caution – Use proper ESD grounding techniques when handling components. See "Safety Precautions" on page 1-1.

1. **Place the operator panel keyholes over the guide pins and gently push the operator panel towards the front of the server.**

   If the operator panel will not move forward, gently adjust where the light pipes at the front of the operator panel fit into the sockets at the front of the server.

2. **Tighten the captive screw that holds the operator panel in place.**
3. **Connect the operator panel keyswitch cable.**
4. **Connect the operator panel signal cable.**

15.2.3 Securing the Server

1. **Slide the server into the equipment rack and secure the stabilizer bar.**

   See "Sliding the Server Into the Equipment Rack" on page 5-4.

2. **Install the fan cage and tighten the three (3) captive screws to secure it in place.**

   The SPARC Enterprise M4000 server uses only two (2) captive screws.

3. **Install the 172-mm fan units.**

   See "Installing the 172-mm Fan Module" on page 10-9.

4. **Power on the server.**

   This step includes reconnecting power cables, verifying the state of the LEDs, and turning the keyswitch to the Locked position. See "Powering the Server On Using Software" on page 4-13.

5. **Use the `showhardconf` command to confirm that the new component is installed.**

```
XSCF> showhardconf
```

   Refer to "Verifying Hardware Operation" on page 4-9 for more information.

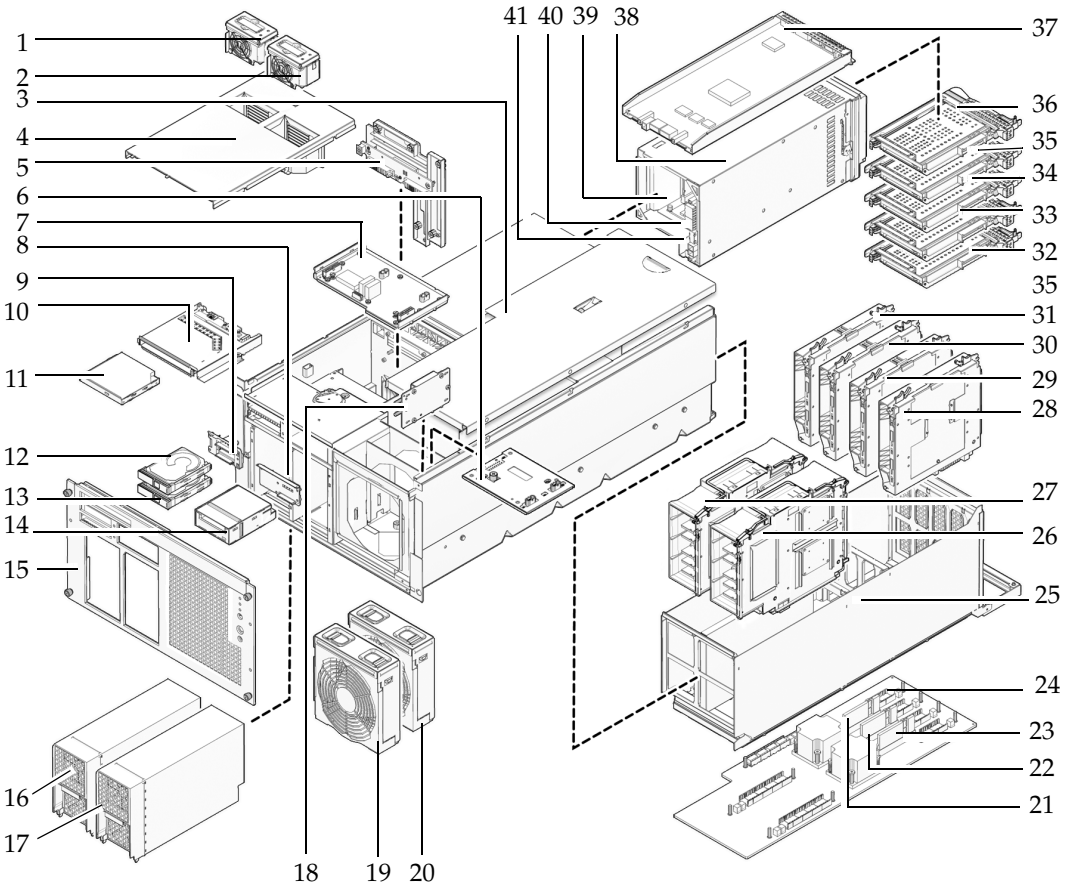
APPENDIX **A**

Components List

This appendix shows the server nomenclature and component numbering.

FIGURE A-1 shows the SPARC Enterprise M4000 server.

FIGURE A-1 SPARC Enterprise M4000 Component Locations

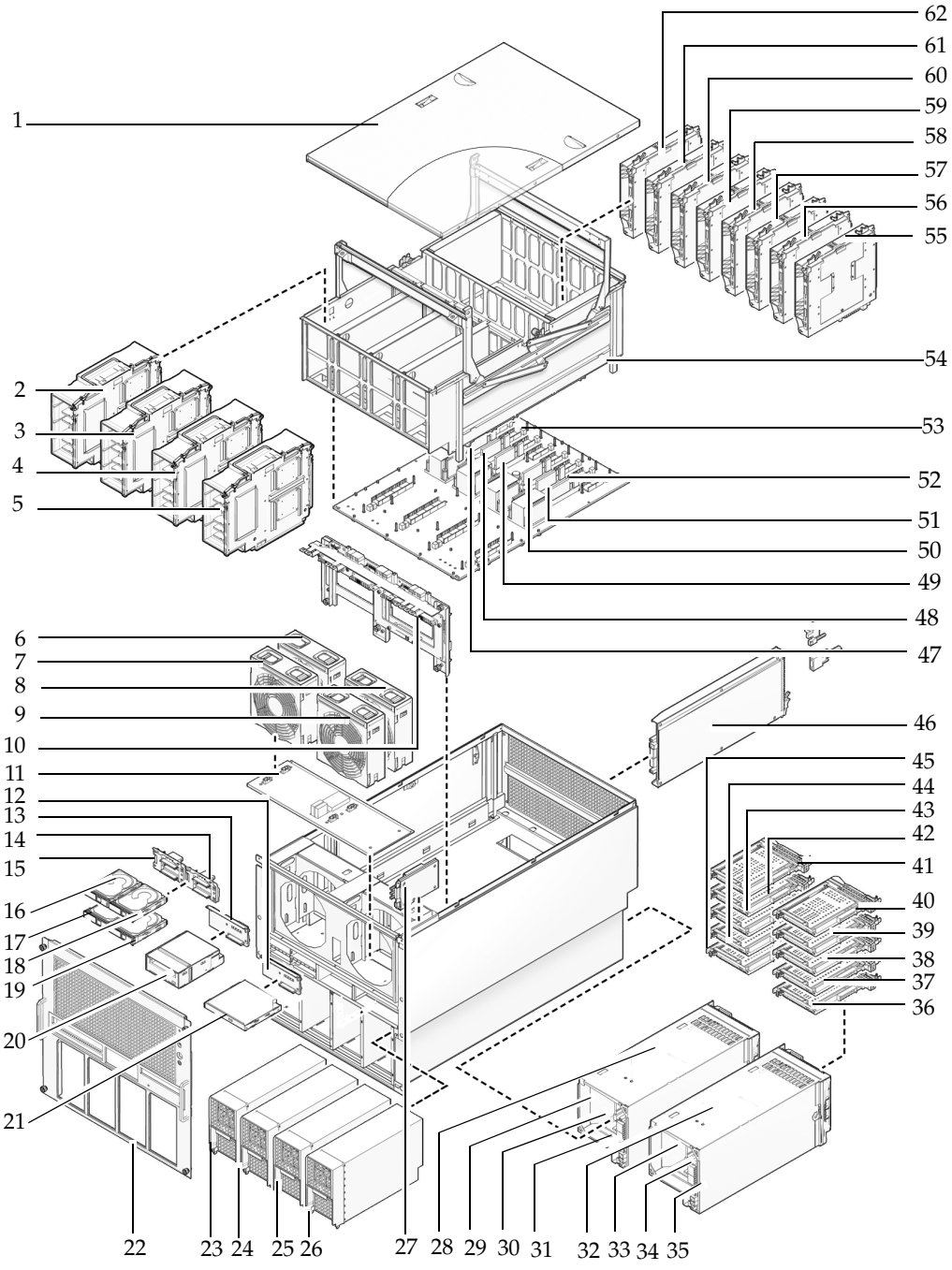


Location Number	Component	Location Number	Component
1	60-mm fan (FAN_B#0)	22	DC-DC Converter (DDC_A#0)
2	60-mm fan (FAN_B#1)	23	DC-DC Converter (DDC_A#1)
3	Top cover	24	Motherboard unit (MBU_A)
4	Fan cover	25	Motherboard carriage
5	Backplane unit (BPU_A - includes IOBP, Power distribution board)	26	CPU module (CPUM#1)
6	172-mm fan backplane (FANBP_A)	27	CPU module (CPUM#0)
7	60-mm fan backplane (FANBP_B)	28	Memory board (MEMB#3)

Location Number	Component	Location Number	Component
8	Tape drive backplane (TAPEBP)	29	Memory board (MEMB#2)
9	Hard disk drive backplane (HDDBP#0)	30	Memory board (MEMB#1)
10	CD-RW/DVD-RW backplane (DVDBP_A)	31	Memory board (MEMB#0)
11	CD-RW/DVD-RW Drive Unit (DVDU)	32	PCI cassette (IOU#0 PCI#0)
12	Hard disk drive (HDD#1)	33	PCI cassette (IOU#0 PCI#1)
13	Hard disk drive (HDD#0)	34	PCI cassette (IOU#0 PCI#2)
14	Tape drive unit (TAPEU)	35	PCI cassette (IOU#0 PCI#3)
15	Front-panel	36	PCI cassette (IOU#0 PCI#4)
16	Power supply unit 48V (PSU#0)	37	eXtended System Control facility unit (XSCFU)
17	Power supply unit 48V (PSU#1)	38	I/O unit (IOU#0)
18	Operator panel (OPNL)	39	DC-DC Converter Riser (DDCR IOU#0 Not shown)
19	172-mm fan module (FAN_A#0)	40	DC-DC Converter (DDC_B on DDCR on IOU#0 Not shown)
20	172-mm fan module (FAN_A#1)	41	DC-DC Converter (DDC_A IOU#0 Not shown)
21	DC-DC Converter (DDC_B#0)		

FIGURE A-2 shows the SPARC Enterprise M5000 server.

FIGURE A-2 SPARC Enterprise M5000 Component Locations



Location Number	Component	Location Number	Component
1	Top cover	32	I/O unit (IOU#1)
2	CPU module (CPUM#0)	33	DC-DC Converter Riser (DDCR IOU#1 Not shown)
3	CPU module (CPUM#1)	34	DC-DC Converter (DDC_B on DDCR on IOU#0 Not shown)
4	CPU module (CPUM#2)	35	DC-DC Converter (DDC_A#0 IOU#1 Not shown)
5	CPU module (CPUM#3)	36	PCI cassette (PCI#0 IOU#1)
6	172-mm fan (FAN_A#1)	37	PCI cassette (PCI#1 IOU#1)
7	172-mm fan (FAN_A#0)	38	PCI cassette (PCI#2 IOU#1)
8	172-mm fan (FAN_A#3)	39	PCI cassette (PCI#3 IOU#1)
9	172-mm fan (FAN_A#2)	40	PCI cassette (PCI#4 IOU#1)
10	Backplane unit (BPU_B - includes IOBP, Power distribution board, bus bar)	41	PCI cassette (PCI#4 IOU#0)
11	172-mm fan backplane (FANBP_C)	42	PCI cassette (PCI#3 IOU#0)
12	CD-RW/DVD-RW backplane (DVDBP_B)	43	PCI cassette (PCI#2 IOU#0)
13	Tape backplane (TAPEBP)	44	PCI cassette (PCI#1 IOU#0)
14	Hard disk drive backplane (HDDBP#1 IOU#1)	45	PCI cassette (PCI#0 IOU#0)
15	Hard disk drive backplane (HDDBP#0 IOU#0)	46	Extended System Control facility unit (XSCFU)
16	Hard disk drive (HDD#1 IOU#0)	47	DC-DC Converter (DDC_A#0)
17	Hard disk drive (HDD#0 IOU#0)	48	DC-DC Converter (DDC_A#1)
18	Hard disk drive (HDD#3 IOU#1)	49	DC-DC Converter (DDC_A#2)
19	Hard disk drive (HDD#2 IOU#1)	50	DC-DC Converter (DDC_A#3)
20	Tape drive unit (TAPEU)	51	DC-DC Converter (DDC_B#0)
21	CD-RW/DVD-RW Drive Unit (DVDU)	52	DC-DC Converter (DDC_B#1)
22	Front-panel	53	Motherboard unit (MBU_B)
23	Power supply unit (PSU#0)	54	Motherboard carriage
24	Power supply unit (PSU#1)	55	Memory board (MEMB#7)
25	Power supply unit (PSU#2)	56	Memory board (MEMB#6)
26	Power supply unit (PSU#3)	57	Memory board (MEMB#5)

Location Number	Component	Location Number	Component
27	Operator panel (OPNL)	58	Memory board (MEMB#4)
28	I/O unit (IOU#0)	59	Memory Board (MEMB#3)
29	DC-DC Converter Riser (DDCR IOU#0 Not shown)	60	Memory board (MEMB#2)
30	DC-DC Converter (DDC_B on DDCR on IOU#0 Not shown)	61	Memory board (MEMB#1)
31	DC-DC Converter (DDC_A#0 IOU#0 Not shown)	62	Memory board (MEMB#0)

APPENDIX **B**

Rules for System Configuration

This appendix shows the system configurations for the midrange servers.

B.1 Server Configuration

TABLE B-1 shows the hardware configuration of the midrange servers.

TABLE B-1 System Features

Features	SPARC Enterprise M4000 Server	SPARC Enterprise M5000 Server	Notes
Motherboard unit	1	1	The CPU, memory subsystem, and I/O subsystem are directly connected to implement data transfer by using a high-speed broadband switch. Because individual components, which are connected through tightly coupled switches, use an even latency for data transfer, components can be added to the system to enhance the processing capability (in proportion to the number of components added). When a data error is detected in a CPU, memory access controller (MAC), or I/O controller (IOC), the system bus agent corrects the data and transfers it.
CPU module (2 processor chips per CPU module)	2	4	The CPU module consists of two CPU chips. The CPU is a high-performance multicore processor. It contains an on-chip secondary cache to minimize memory latency. It supports the instruction retry function that enables continuous processing by retrying instructions when any error is detected. At least one CPU Module (CPUM) is required on each XSB.
Memory board (8 DIMMs per memory board)	4 (32 DIMMs total)	8 (64 DIMMs total)	The memory boards use Double Data Rate (DDR II) type DIMMs. The memory subsystem supports up to eight-way memory interleaving for high-speed memory access. At least one Memory Board (MEMB) is required on each XSB. The quantity of Memory Boards on an XSB must be a power of two (either 1, 2, or 4). If mixed memory types are required on a Memory Board, larger DIMMs must be placed in Bank A first, all DIMMs in a bank must be of the same type, and each Memory Board on an XSB must be configured identically.

TABLE B-1 System Features *(Continued)*

Features	SPARC Enterprise M4000 Server	SPARC Enterprise M5000 Server	Notes
I/O unit (IOU)	1	2	Each IOU contains the following: • PCI cards—Four short PCI Express (PCIe) slots (four upper slots) and one short PCI-X slot (lowest slot). • One I/O controller (IOC) chip, which is the bridge chip between the system bus and the IO bus. • Inter-integrated circuit (I2C) components for environmental monitoring. • PCIe switches or bridges connected to the slots. You can also add an optional IOBOX, which contains additional PCIe slots or PCI-X slots. An IOU requires a CPUM and MEMB on the same XSB in order to be used. In the case of quad-XSB, the slots on an IOU are divided up among the first two parts of a quad-XSB. The assignments cannot be changed. A separate CPUM and MEMB are required on each part of the quad-XSB in order to access the slots of the IOU assigned to the parts of the quad-XSB.
PCI cassettes	5 cassettes per tray in the IOU	• 5 cassettes per tray in the IOU • 2 IOUs (10 cassettes)	
PCI cards	5 (1 PCI-X and 4 PCIe)	10 (2 PCI-X and 8 PCIe)	
eXtended System Control facility unit	1	1	The service processor, which operates independently from the SPARC64™ VI or SPARC64™ VII processor, is a small system that directs the system startup, reconfiguration, and fault diagnosis. This is where the system management software (XSCF) runs.

TABLE B-1 System Features *(Continued)*

Features	SPARC Enterprise M4000 Server	SPARC Enterprise M5000 Server	Notes
Power supplies (2000W)	2 (1+ 1 redundant)	4 (2 + 2 redundant)	
Redundant cooling	• Four fans per server • Two 172-mm fans (One fan is redundant) • Two 60-mm fans (One fan is redundant)	• Four 172-mm fans per server • Two fans are redundant	
Internal drives	1 DVDU, 2 hard disk drives, 1 tape drive unit (optional)	1 DVDU, 4 hard disk drives, 1 tape drive unit (optional)	

APPENDIX **C**

FRU List

This appendix shows the midrange server FRUs and is divided into the following sections:

- "Server Overview" on page C-1
- "System Boards" on page C-3
- "Backplane Unit" on page C-6
- "I/O Unit" on page C-6
- "Power" on page C-7
- "FAN Module" on page C-8
- "eXtended System Control Facility Unit" on page C-9
- "Drives" on page C-10

C.1 Server Overview

The midrange systems are high-performance systems based on the SPARC 64 VI or SPARC 64 VII processors that use the Solaris Operating System. They share common field-replaceable units (FRUs). FRUs are any components that can be replaced in the field by trained service technicians.

TABLE C-1 identifies the FRU components.

TABLE C-1 Midrange Server FRU Components

Component	Redundant	Cold Replacement	Hot Replacement	Active Replacement
Motherboard unit	No	Yes		
Motherboard DC-DC Converter	No	Yes		
CPU module	No	Yes		
Memory board	Yes	Yes		
DIMM	No	Yes		
eXtended System Control facility unit	No	Yes		
I/O unit	No	Yes		
I/O DC-DC Converter	No	Yes		
I/O DC-DC Converter Riser	No	Yes		
PCI cassette	No	Yes	Yes	Yes
Fan	Yes	Yes	Yes	Yes
Fan backplane	No	Yes		
Power supply unit	Yes	Yes	Yes	Yes
Busbar/I/O backplane/power backplane (SPARC Enterprise M5000)	No	Yes		
I/O backplane/power backplane (SPARC Enterprise M4000)	No	Yes		
Hard disk drive	Yes	Yes	Yes	Yes
Tape drive unit (optional)	No	Yes	Yes	Yes
CD-RW/DVD-RW Drive Unit (DVDU)	No	Yes	Yes	
Operator panel	No	Yes		

Note – If the hard disk drive is the boot device, the hard disk will have to be replaced using cold replacement procedures. However, active replacement can be used if the boot disk can be isolated from the Solaris OS by disk mirroring software or other software. The procedure for isolating the hard disk drive from the Solaris OS varies depending on whether disk mirroring software or other support software is used. For details, see the relevant software manuals.

C.2 System Boards

C.2.1 Motherboard Unit

The motherboard unit is the main circuit board for the midrange servers. The following components connect to the motherboard unit:

- CPU modules (two CPU chips per module)
- Memory boards
- Backplane unit
- I/O unit(s) through the I/O backplane
- eXtended System Control facility unit through the busbar/I/O backplane/power backplane unit
- Motherboard DC-DC Converter

The SPARC Enterprise M4000 motherboard unit provides power and signals to its mounted components by a riser card. The SPARC Enterprise M5000 motherboard unit supplies power to its mounted components from the power supply backplane by the bus bar/I/O backplane/power backplane unit. To remove and replace the motherboard you must power off the system, which is serviced from the top of the servers.

Refer to "Motherboard Unit Replacement" on page 13-1 for replacement procedures.

C.2.2 CPU Module

TABLE C-2 lists the maximum number of CPU modules that can be installed in the system, their locations, and how the CPU modules must be serviced. Each CPU module contains two SPARC 64 VI or SPARC 64 VII processor chips. Each processor chip incorporates and implements the following:

- Chip multithreading (CMT) design that sequentially executes the multiple processes on the CPU.
- Dual core processors per CPU module (with four CPU modules there are eight processors and 16 cores).
- Quad core processors per CPU module (with four CPU modules there are eight processors and 32 cores).
- SPARC Instruction Set Architecture (ISA).
- Visual Instruction Set (VIS) extension, which accelerates multimedia, networking, encryption, and Java™ processing.

TABLE C-2 CPU Module Features

	SPARC Enterprise M4000 Server SPARC64 VI	SPARC Enterprise M4000 Server SPARC64 VII	SPARC Enterprise M5000 Server SPARC64 VI	SPARC Enterprise M5000 Server SPARC64 VII
Maximum number of CPU modules	2	2	4	4
Maximum number of CPUs per server	4	4	8	8
Number of cores per CPU	2	4	2	4
CPU module location	Top of server	Top of server	Top of server	Top of server
Active replacement capability	No	No	No	No
Hot replacement capability	No	No	No	No
Cold replacement capability	Yes	Yes	Yes	Yes

Refer to "CPU Module Replacement" on page 12-1 for replacement procedures.

C.2.3 Memory Board

Each memory board provides a memory access controller (MAC) and eight DIMM slots. To remove or install memory boards, you must power the server off. TABLE C-3 lists the memory board features.

TABLE C-3 Memory Board Features

	SPARC Enterprise M4000 Server	SPARC Enterprise M5000 Server
Maximum Number of memory boards	4	8
Maximum Number of DIMMs	32 (8 DIMMs per memory board	64 (8 DIMMs per memory board)
Location	Top of server	Top of server
Active replacement capability	No	No
Hot replacement capability	No	No
Cold replacement capability	Yes	Yes

Four or Eight DIMMs are located in each memory board. To install DIMMs, you must remove the memory board and open the memory board's case. The servers use double data rate (DDR)-II type memory with the following features:

- ECC error protection
- Recovery from memory chip failures
- Mirror configuration

Refer to "Memory Board Replacement" on page 11-1 for replacement procedures.

C.3 Backplane Unit

The midrange servers contain an I/O backplane/power backplane unit, which is a circuit board containing a set of sockets to which other circuit boards can be connected.

Refer to "Backplane Unit Replacement" on page 14-1 for replacement procedures.

C.4 I/O Unit

The I/O in the midrange servers is handled by four separate Peripheral Component Interconnect (PCI) buses. These industry-standard buses support all of the servers on-board I/O controllers in addition to the interface cards in the system.

The I/O unit (IOU) is identical in both midrange servers. The IOU monitors I/O events and has the following features:

- PCI cards (see TABLE C-4)
- Inter-integrated circuit (I2C) components for environmental monitoring
- PCI-Express switches or bridges connected to the slots

There is one IOU in the SPARC Enterprise M4000 server and two IOUs in the SPARC Enterprise M5000 server. Each IOU has one I/O controller. There are four PCI buses in each server. To remove or install the IOU, you must halt the Solaris OS and power off the server (cold replacement).

The IOU houses the following:

- Four PCIe short card slots (four upper slots)
- One PCI-X short card slot (lowest slot)

The IOU holds cassettes that support two types of PCI cards (TABLE C-4):

- PCIe
- PCI-X

TABLE C-4 PCI-Express (PCIe) and PCI-eXtended (PCI-X) Features

PCI-Express (PCIe) Features	PCI eXtended (PCI-X) Features
• High-speed serial, point-to-point interconnect. • Expands and doubles the data transfer rates compared with the original PCI.	• Faster version of the parallel bus PCI standard. • PCI-X bus has improved protocols and a faster clock rate compared with the parallel bus PCI standard.

Refer to "I/O Unit Replacement" on page 8-1 for replacement procedures.

C.5 Power

Power is provided to both midrange servers by power supply units. The redundant power supplies allow continued system operation if a power supply fails. TABLE C-5 lists the power supply features and specifications.

TABLE C-5 Power Supply Features

	SPARC Enterprise M4000 Server	SPARC Enterprise M5000 Server
Number of power cords	1 power cord per power supply unit 2 power cords are required for redundancy	1 power cord per power supply unit 4 power cords are required for redundancy
Redundancy	1 + 1 redundant Second power supply is redundant at 200 VAC	2 + 2 redundant Second and fourth power supplies are redundant at 200 VAC
Active replacement capability	Yes	Yes
Hot replacement capability	Yes	Yes
Cold replacement capability	Yes (from front)	Yes (from front)
Redundant AC input	Yes	Yes
Input voltage	100–127 VAC 200–240 VAC	100–127 VAC 200–240 VAC
Frequency	50–60 Hz	50–60 Hz
Maximum current	24.0A at 100–127 VAC, (12A/cord) 12.0A at 200–240 VAC, (12A/cord)	48A at 100–127 VAC (12A/cord) 24A at 200–240 VAC (12A/cord)

TABLE C-5 Power Supply Features *(Continued)*

	SPARC Enterprise M4000 Server	SPARC Enterprise M5000 Server
Volt ampere	2,058 VA	3,815 VA
Power draw (maximum)	2,016W (2 power cords)	3,738W (4 power cords)
Heat	6,879 BTUs/hr (7258 kJ/hr)	1,2754 BTUs/hr (13457 kJ/hr)

There are two fans in each power supply unit.

The SPARC Enterprise M5000 server has a I/O backplane/power backplane/busbar unit, located near the center of the lower half of the system, which provides these functions:

- Power conductor to the power supply backplane, fan backplane, power supply backplane, and motherboard unit
- Connectivity between the various backplanes and the motherboard with FRUs and system components

Refer to Chapter 7 for replacement procedures.

C.6 FAN Module

The fans in the midrange servers move air currents into and out of the server. If one fan fails, the eXtended System Control Facility (XSCF) detects the failure and uses the redundant fan(s). Both servers use 172-mm fans (FAN_A) as the primary cooling system. The 60 mm fans (FAN_B) in the SPARC Enterprise M4000 server are used for additional cooling. TABLE C-6 describes the fan features.

TABLE C-6 Fan Module Features

	SPARC Enterprise M4000 Server	SPARC Enterprise M5000 Server
Number of fans	4 fans • 2 172-mm fans • 2 60-mm fans	4 172-mm fans
Fan location	172-mm fans—Top of system near the front 60-mm fans—Top of system Above the power supply units	Top of system near the front
Active replacement capability	Yes	Yes

TABLE C-6 Fan Module Features *(Continued)*

	SPARC Enterprise M4000 Server	SPARC Enterprise M5000 Server
Hot replacement capability	Yes	Yes
Cold replacement capability	Yes	Yes
Redundant cooling	2 172-mm fans (1 + 1 redundant) 2 60-mm fans (1+ 1 redundant)	4 172-mm fans (2 + 2 redundant)

Refer to "Fan Modules Replacement" on page 10-1 for replacement procedures.

C.7 eXtended System Control Facility Unit

The eXtended System Control facility unit (XSCFU or XSCF unit) contains the service processor that operates and administrates the servers. It diagnoses and starts the entire system, configures domains, offers dynamic reconfiguration, as well as detects and notifies various failures.

The XSCF unit uses the eXtended System Control Facility (XSCF) software to provide the following functions:

- Controls and monitors the main unit hardware
- Monitors the Solaris OS, power-on self-test (POST), and the OpenBoot PROM
- Controls and manages the interface for the system administrator (such as a terminal console)
- Administers device information
- Messages various events remotely
- Interlocks power due to remote cabinet interface (RCI)

Note – To use RCI, a SPARC Enterprise server or a device with an RCI port is required.

Both midrange servers have one XSCF unit, which is serviced from the rear of the system. To replace it, you must power off the server.

Refer to "XSCF Unit Replacement" on page 9-1 for replacement procedures.

C.8 Drives

Both servers provide front-panel access to the drives. TABLE C-7 list the drive units on the midrange servers.

TABLE C-7 Drives Offered on the Midrange Servers

SPARC Enterprise M4000 Server	SPARC Enterprise M5000 Server
2 hard disk drives	4 hard disk drives
1 CD-RW/DVD-RW Drive Unit	1 CD-RW/DVD-RW Drive Unit
1 tape drive unit (optional)*	1 tape drive unit (optional)

* Contact your sales representative for tape drive unit options on SPARC Enterprise M4000/M5000 servers.

C.8.1 Hard Disk Drive

TABLE C-8 lists the features and specifications of the hard disk drive.

TABLE C-8 Hard Disk Drive Features and Specifications

	SPARC Enterprise M4000 Server	SPARC Enterprise M5000 Server
Number of hard disk drives	2	4
Active /replacement capability	Yes	Yes
Hot replacement capability	Yes	Yes
Cold replacement capability	Yes	Yes
Interface	Serial Attached SCSI (SAS)	Serial Attached SCSI (SAS)
Location	Front of system	Front of system

SAS devices have two data ports. Because each data port resides in a different SAS domain, this enables complete failover redundancy. If one path fails, there is communication along a separate and independent path.

Refer to "Hard Disk Drive Replacement" on page 6-1 for replacement procedures.

C.8.2 CD-RW/DVD-RW Drive Unit (DVDU)

TABLE C-9 lists the features, location, and specifications of the CD-RW/DVD-RW Drive Unit.

TABLE C-9 CD-RW/DVD-RW Drive Unit Features and Specifications for Midrange Servers

	Midrange Servers
Number of CD-RW/DVD-RW Drive Units	1
Location	Front of system to the right of the disk drives
Active replacement capability	No
Hot replacement capability	Yes
Cold replacement capability	Yes
Interface	Advanced Technology Attachment Packet Interface (ATAPI)

The Advanced Technology Attachment Packet Interface (ATAPI) is an interface between the computer system and the CD-RW/DVD-RW and tape drive units.

Refer to "CD-RW/DVD-RW Drive Unit (DVDU) Replacement" on page 6-12 for replacement procedures.

C.8.3 Tape Drive Unit (TAPEU)

TABLE C-10 lists the features, location, and specifications of the optional tape drive unit.

TABLE C-10 Tape Drive Unit Features and Specifications for Midrange Servers

	Midrange Servers
Number of tape drive units	1 (optional)
Location	Front of system
Active replacement capability	Yes
Hot replacement capability	Yes
Cold replacement capability	Yes
Tape drive unit type*	Digital audio tape (DAT) drive
Interface	Serial Advanced Technology Attachment (SATA) (see TABLE C-11)

TABLE C-10 Tape Drive Unit Features and Specifications for Midrange Servers *(Continued)*

	Midrange Servers
Data transfer rate	About 6 MB per second
Capacity	36 Gbytes of data (noncompressed format) 72 Gbytes of data (double-compressed format)
Media type	Sequential access

* Contact your sales representative for tape drive unit options on SPARC Enterprise M4000/M5000 servers.

The Serial Advanced Technology Attachment (SATA) interface is a serial link between the computer and the tape drive unit (TABLE C-11).

TABLE C-11 Serial Advanced Technology Attachment (SATA) Specifications

Transfer Rate	150 MB per second or faster (see TABLE C-10)
Cable length	Up to one meter (39.37 inches)
Design Advantage	• Thinner than conventional serial cables • Improved cooling efficiency inside the system

Refer to "Tape Drive Unit Replacement" on page 6-22 for replacement procedures.

APPENDIX **D**

External Interface Specifications

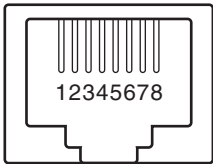
This appendix describes the specifications of the connectors provided on the SPARC Enterprise server unit:

- "Serial Port" on page D-2
- "UPC (UPs Control) Port" on page D-3
- "USB Port" on page D-3

■ “Connection Diagram for Serial Cable” on page D-4

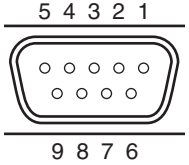
D.1 Serial Port

TABLE D-1 Serial Port

Setting	Pin No	Signal Name	Input/Output	Description
	1	RTS	Output	Request to Send
	2	DTR	Output	Data Terminal Ready
	3	TXD	Output	Send Data
	4	GND	---	Ground
	5	GND	---	Ground
	6	RXD	Input	Receive Data
	7	DSR	Input	Data Set Ready
	8	CTS	Input	Clear to Send

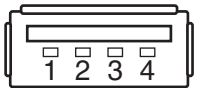
D.2 UPC (UPs Control) Port

TABLE D-2 UPC (UPs Control) Port

Setting	Pin No	Signal Name	Input/Output	Description
	1	ER	Output	Equipment power-on report signal
	2	NC	---	Not connected
	3	NC	---	Not connected
	4	NC	---	Not connected
	5	SG	---	Ground
	6	*BPS	Input	UPS hardware error signal
	7	*BTL	Input	Battery end of discharge warning signal
	8	NC	---	Not connected
	9	*ACOFF	Input	Power failure detection signal

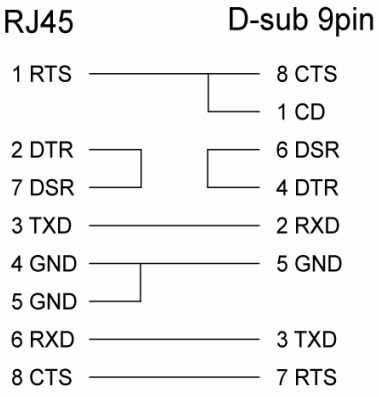
D.3 USB Port

TABLE D-3 USB Port

Setting	Pin No	Signal Name	Input/Output	Description
	1	VBUS	Output	Power supply
	2	-DATA	Input/output	Data
	3	+DATA	Input/output	Data
	4	GND	---	Ground

D.4 Connection Diagram for Serial Cable

FIGURE D-1 Connection Diagram for Serial Cable



APPENDIX **E**

UPS Controller

This appendix explains the UPS controller (UPC) that controls the uninterruptible power supply (UPS) unit.

- Section E.1, “Overview” on page E-1
- Section E.2, “Signal Cables” on page E-1
- Section E.3, “Signal Line Configuration” on page E-2
- Section E.4, “Power Supply Conditions” on page E-3
- Section E.5, “UPS Cable” on page E-4
- Section E.6, “UPC Connector” on page E-5

E.1 Overview

A UPS unit is used to provide a stable supply of power to the system in the event of a power failure or an extensive power interruption.

When a failure is detected in the supply of power, an error can be reported to the server through the signal cable connection between a UPC port on the server and a UPS that has the UPC interface. Then the server can execute emergency shutdown processing to safely shut down the system.

E.2 Signal Cables

Use shielded and paired cables. The cables have the following specifications:

- DC resistance (roundtrip/1 pair): 400 Ω/km or less
- Cable length: Up to 10 m (33 ft)

E.3 Signal Line Configuration

This section describes signal definitions and electrical specifications.

FIGURE E-1 shows the signal line configuration when connected to a UPS.

FIGURE E-1 Connection with UPS and the Server

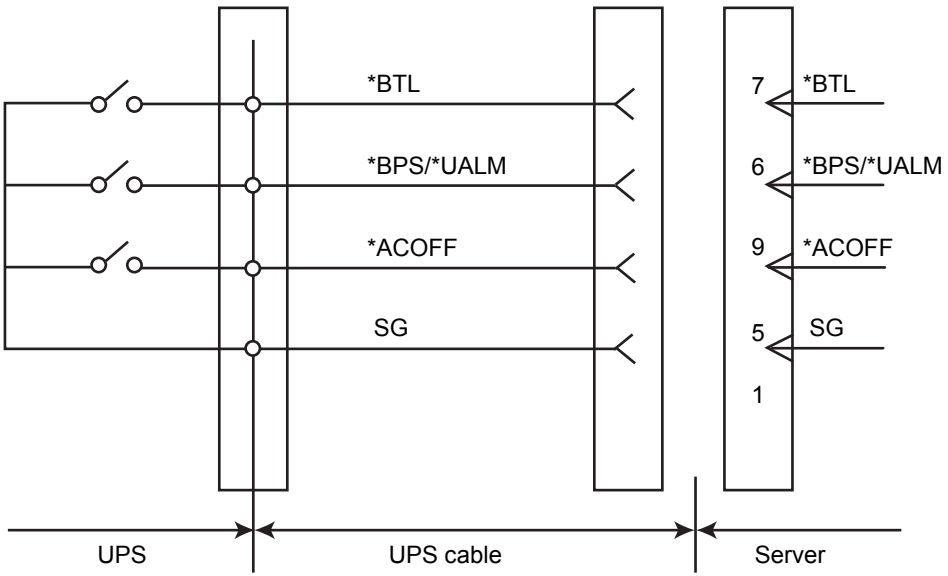


TABLE E-1 defines these signal lines.

TABLE E-1 UPS Interface Signals

Signal name	Definitions	Pin number	Remarks
*BPS/*UALM	Signal indicates faulty UPS conditions	6	Normal: OFF Failure: ON
*BTL	Signal provides a warning of a low battery level and a pending UPS failure.	7	Normal: OFF Warning: ON (Note1)

Signal name	Definitions	Pin number	Remarks
*ACOFF	Signal indicates power failure at the commercial AC supply connector to the UPS	9	Normal: OFF Power failure: ON (Note2)
SG	Signal ground	5	
ER	Signal indicates the main unit is running (Equipment Ready)	1	Do not connect to ER signal pin.

ON:Indicates contacts are closed

OFF: Indicates contacts are open

Note1: Use a UPS capable of normal battery power supply operation for at least 10 to 60 seconds after this signal is turned on.

Note2: Use a UPS capable of normal battery power supply output without turning on the *ACOFF in an instantaneous commercial AC power failure lasting two seconds or less.

E.4 Power Supply Conditions

TABLE E-2 and TABLE E-3 list the electrical specifications for the UPS interface.

E.4.1 Input circuit

TABLE E-2 Electrical specifications

Signal name	Input conditions
*BPS/*UALM *BTL *ACOFF	No voltage relay contact Contact rating DC 12 V, 10 mA or more (maximum 0.5A) Use of metallic contact, or lead relay is recommended.

Limit the signal-line chatter period to 1ms or less.

E.4.2 Output circuit

TABLE E-3 Electrical specifications

Signal name	Output conditions		
ER	Output Voltage	VOH	3.76 VDC (min)
		VOL	0 to 0.4 VDC (max)
	Output Current	IOH	- 4 mA (max)
		IOL	4 mA (max)

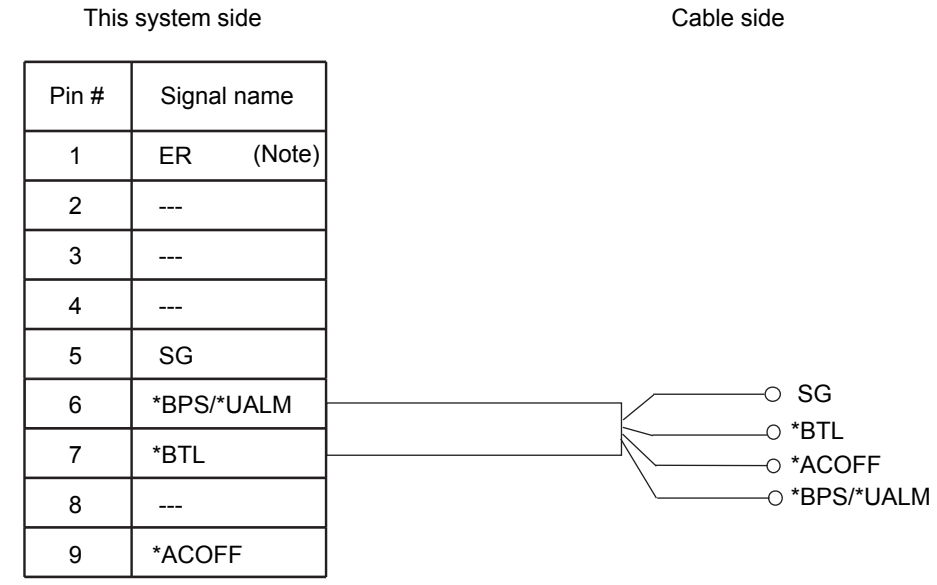
E.5 UPS Cable

The UPS cable specifications are as follows:

- Connector type:
  - D-SUB9 pin Male (install side: Female)
  - DEU-9PF-F0
- Terminal array

  FIGURE E-2 identifies pin signals of the UPC connector and the UPS cable.
  Do not use the unused pins (pin number 2, 3, 4 and 8 in the following diagram).
  Cable side shown below.

FIGURE E-2 Corresponding terminals in UPC connector and the UPS cable



Note: Do not use ER signal.

Note – If you need UPC cables, you need to make arrangements separately. For details, contact your sales representatives.

E.6 UPC Connector

This chapter describes the location of the UPC connector and the UPS connections.

- UPC#0 connects with UPS#0. UPC#1 connects with UPS#1.
- The single power feed uses UPC#0 only.
- The dual power feed option uses UPC#0 and UPC#1.

APPENDIX **F**

Abbreviations

This appendix lists out the proper names of acronyms found in this manual.

TABLE F-1 Acronyms

Abbreviation	Full name
ASIC	Application-specific integrated circuit
AT	Advanced technology
ATAPI	AT attachment packet interface
BUI	Browser-based user interface
CH	Channel
CMP	Chip multi-processor
CMT	Chip multithreading
CB	Circuit breaker
CLKU	Clock control unit
CLI	Command-line interface
CMU-CH	CMU channel
CE	Correctable error
CPU	Central processing unit
CPUM	CPU module
DAT	Digital audio tape
DCL	Domain component list
DDC	DC to DC converter
DE	Diagnosis engine
DID	Domain ID

TABLE F-1 *(Continued)*Acronyms

Abbreviation	Full name
DIMM	Dual inline memory module
DRAM	Dynamic random access memory
Ecache	External cache
ECC	Error correction code
FANBP	Fan backplane
FMA	Fault management architecture
FRU	Field-replaceable unit
FMEMA	Floating memory address
GBps	Gigabyte per second
GHz	Gigahertz
GUI	Graphical user interface
HDD	Hard disk drive
HDDBP	Hard disk drive backplane
I2C bus	Inter integrated circuit bus
ISA	Instruction set architecture
IOBP	I/O backplane
IOU	I/O unit
LCD	Liquid crystal display
LED	Light emitting diode
LSB	Logical system board
LSI	Large scale integration
MAC	Media access control address
MBC	Maintenance bus controller
MEMB	Memory modules
MBU	Motherboard unit
NTP	Network time protocol
NVRAM	Non-volatile random access memory
OPNL	Operator panel
OS	Operating system
PCIe	PCI express

TABLE F-1 *(Continued)*Acronyms

Abbreviation	Full name
PHP	Pci hot plug
POST	Power-on self-test
POR	Power-on reset
PSB	Physical system board
PSU	Power supply unit
PROM	Programmable read-only memory
RAM	Random access memory
SAS	Serial attached SCSI
SATA	Serial ATA
SCF	eXtended System Controller Facility
SRAM	Static RAM
SC	System controller
TC	Throughput computing
TOD	Time of day
UE	Uncorrectable error
UPC	UPS connection interface
UPS	Uninterruptible Power Supply
XCP	XCSF control package
XIR	Externally initiated reset
XSB	eXtended System board
XSCF	eXtended System Control Facility
XSCFU	eXtended System Control facility unit

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